American Society of Civil Engineers.

PROCEEDINGS.

Vol. XVI.—January, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JANUARY 1st, 1890.—There not being a quorum present (New Years Day being a legal holiday), the meeting was adjourned to January 2d, 1890.

JANUARY 2d, 1890.—There not being a quorum present, the meeting was adjourned to January 15th, 1890.

THE ANNUAL MEETING.—JANUARY 15TH, 1890.

The Annual Meeting was called to order by the President, Mr. Max J. Becker.

The Past Presidents present, Mr. James B. Francis, Mr. D. J. Whittemore and General G. S. Greene, were invited to take seats on the platform.

The Secretary announced the programme of the annual meeting, excursions, etc.

The Secretary also read the invitation of the Engineers' Club to a reception at their Club House, and a letter from the Electrical Club tendering the freedom of the Club to the members of the American Society of Civil Engineers during their stay in the city.

The SECRETARY.—Mr. President, the meeting of the Society which would have occurred regularly on January 1st, was adjourned on that date because of the absence of a quorum, which was on account of its

being a holiday, no doubt; the meeting was adjourned to the present date in order that the canvass of the ballot for membership might be made now; consequently, in addition to the appointment of Tellers to canvass the ballot for officers, it will be necessary at this time to appoint Tellers also to canvass the ballot for membership which has not yet been canvassed.

The President appointed Mr. Robert Cartwright and Mr. A. D. Foote to canvass the ballot for officers.

The SECRETARY.—It has always been customary, Mr. President, at this moment to determine a time at which the ballot for officers should close; last year it was determined that the ballot should close at 11.30.

The PRESIDENT.—Any suggestions on this question?

A MEMBER.—I move that the polls close at 11.30.

The PRESIDENT.—It is moved and seconded that the time of closing the reception of votes be fixed at 11.30. (Carried.)

The PRESIDENT.—The Tellers to canvass the ballot for members will be Mr. F. O. Whitney, Mr. G. P. Low and Mr. S. L. Cooper.

The minutes of meetings of December 4th and 18th, and January 1st were read and approved.

The Secretary read the report of the Board of Direction which, on motion, was received and ordered printed.*

The report of the Treasurer was read.*

The report of the Finance Committee was read.*

On motion, both these reports were received and ordered printed.

The Board of Censors to award the Norman Medal presented the following report:

The Board of Censors appointed to award the Norman Medal for the year terminating August 1st, 1889, report that in their judgment the medal should be awarded to Paper No. 418, "American Railroad Bridges," by Theodore Cooper, M. Am. Soc. C. E.

Respectfully submitted,

RUDOLPH HERING,
CHARLES F. LOWETH,
F. W. D. HOLBROOK,
Board of Censors.

The Committee to award the Rowland Prize made the following report:

The Committee appointed to award the Rowland Prize for the year terminating August 1st, 1889, report that in their judgment the prize should be awarded to Paper No. 398, "The Construction of the Sweetwater Dam," by James D. Schuyler, M. Am. Soc. C. E.

Respectfully submitted,

G. Y. WISNER,
ALFRED NOBLE,
JOHN BOGART,
Committee.

* See subsequent pages.

The PRESIDENT.—The Secretary will announce the membership of the Committee on Tests of Structural Material.

The SECRETARY.—This is the Committee appointed on the following resolution, presented at the last Convention, and afterwards submitted to letter ballot and adopted by the Society. The resolution is as follows :

Resolved, That a Committee of seven members of this Society be appointed by the President to recommend uniform methods of testing the materials used in metallic structures.

Resolved, That the same Committee be requested to report such requirements for these materials as, in their judgment, may conduce to further improve the grade of such structures.

The following named members have been appointed on this Committee:

Messrs. G. Bouscaren, William H. Burr, J. G. Dagron, R. W. Hunt, H. G. Morse, P. Roberts, Jr., and H. B. Seaman.

This appointment has not been perfected long enough to enable the Committee to make a report at this meeting.

The PRESIDENT.—The Secretary will now announce the membership of the Committee on Standard Sections of Railway Rails.

The SECRETARY.—Mr. President, it seems proper that, on behalf of the Board of Direction, it should be stated that it has taken considerable correspondence to perfect this Committee or the Board would have announced its membership at an earlier date. This Committee was appointed under the following resolution, which was presented and discussed at the Annual Convention, afterwards submitted to the Society by letter ballot and adopted. The resolution is as follows :

Resolved, That a Committee be appointed by the Board of Direction to be authorized and instructed to report to the Society a set of standard rail sections of weights beginning at 40 pounds and advancing by increments of 5 pounds to 100 pounds per linear yard.

The following named members have been appointed as this Committee: Messrs. Bouscaren, Crowell, Felton, H. Stanley, Goodwin, Hawks, R. W. Hunt, Morison, E. D. T. Myers, Rea, Rodd, Wellington, D. J. Whittemore and Wilder.

The appointment of the Committee has but recently been perfected, and they have not yet had time to correspond with each other.

Mr. D. J. WHITTEMORE.—I wish to make a few remarks in connection with this matter at this time. At the last Annual Convention a resolution was passed to letter ballot for the formation of this Committee, and it was carried by a total negative and affirmative vote of about one-fourth of our membership ; three-fourths of the members did not feel enough interest to vote upon it at all.

It has been truly said that rail manufacturers heartily desire uniform sections. We know that railroad companies desire uniform sections, and to secure the best forms that can be devised.

It may be that some engineers of railways would gladly shift the responsibility of designing these forms to a Committee of our Society.

This matter is not insignificant. The steel in the rails of America would band the earth with a girdle one inch thick and fully 10 feet wide, and it is this mass of metal which the action of the Committee would affect.

While I believe it entirely within our province to appoint committees to define uniform methods of tests, uniformity in reckoning time and in the establishment of measures, which will give us proper factors for use in formulas, I am utterly opposed to the establishment of any committee of this Society whose duty it should be to tell us how we should form or treat matter for any of the practical purposes it is intended to subserve.

This should be left to the decision of the individual members of our profession, and any attempt to promulgate forms or designs of materials for practical use through a committee of our Society, I think could be considered as an act to arrest the individual effort of its members, as an act establishing forms as precedents, which, if faulty, individual effort will find very difficult to overcome, and as an act violating the intended purpose of our organization. If the committee be permitted to act I respectfully ask, with this as a precedent, where shall we stop? Could we not with equal propriety demand a committee to tell us how to steam-heat New York City? Would it not be quite as proper to appoint a committee to design all our bridges—in fact every appliance used in the construction and maintenance of railways? Would experts such as our President, Dr. Emery, Messrs. Cooper, Strobel, Macdonald, Clarke, Bonzano, and many others I might name, be willing to give their advice without pay, without reward of any kind; would they be willing to serve on such a committee?

The question naturally arises, is our Society an eleemosynary institution? Shall we ask a committee of apostles to create forms for the relief of rail manufacturers and railway corporations, with no hope of reward except glory, with more than an even chance of receiving directly the opposite? Pecuniarily, that which costs nothing to the producer or user is worth no more than it costs.

It may be said the reports of committees of our Society do not commit the Society in any manner whatever, that at the head of the reports is placed the statement that "The Society is not responsible, as a body, for the facts and opinions advanced in any of its publications," yet you all know that, as a matter of fact, any report will be construed differently by the public at large.

This whole question cannot be properly treated without considering the form of wheel upon the rail and the tie and rail support. The joint is an important factor to be considered, although some of these points

are not covered by the resolution. For myself I will say, that no one can more heartily wish the question of rail forms settled, and when railway managers join hands with railmakers, and, through their paid engineers, endeavor to fix upon forms, they will have my support. They are the only parties pecuniarily interested, and for any virtue they may secure or faults they may create, they will be responsible, and not our Society, which has no pecuniary interest in the matter whatever. Believing that, at this annual meeting we have all the power possessed by us at a convention, I make the following motion:

Resolved, That any action heretofore taken for the appointment of a committee for the purpose of formulating and recommending to the Society standard rail sections be rescinded.

(Seconded by Mr. E. P. North.)

The PRESIDENT.—The question is now open for discussion.

Mr. C. J. BATES.—There seems to be some doubt in the minds of the gentlemen standing near me as to whether this is the time to offer the resolution; we are not quite clear whether this is the proper time or not; if not, when is the proper time?

The PRESIDENT.—It is a question open for discussion whether this is the proper time to take action or whether the proper time arrives when the Committee makes its report.

Major O. E. MICHAELIS.—If we follow the present practice of the House of Representatives, this is the proper time. It has been decided that a majority could decide the special rules of that body. There is nothing else before the house.

The SECRETARY.—It seems to me, Mr. President, it is perfectly proper to offer the resolution; whether it should be passed without a letter-ballot I should be glad to hear discussed.

Major MICHAELIS.—It is offered for a letter-ballot.

The SECRETARY.—Then I should think it was eminently proper to offer at the Annual Meeting a subject for letter-ballot, else how could you do it?

Mr. BATES.—Is not that new business? Or, if it is necessary, I would make a motion, if it is proper to do so, that the question of Mr. Whittemore's resolution be submitted to letter-ballot.

The SECRETARY.—Suppose I read the law for the information of all members, under which the Committee was appointed. It is section 23 of the By-laws, and provides as follows:

SECTION 23.—Special committees to report upon engineering subjects shall be authorized only by a majority of the votes cast by the Society, and in the following manner: Any resolution proposing such a committee shall be referred to the Board of Direction, which shall examine the same and report to the Society a concise statement of the argument for and against the appointment of such committee, which statement shall be printed and issued to the Society with a letter-ballot; or, if the Board fails to report within one month, the letter-ballot shall be issued without comment.

(Question called for.)

Mr. BATES.—This matter came before the Society as an announcement from the Board of Direction. With that announcement I do not see that the Society here has anything to do. Any action in reference to reversing the action of the Society which was settled by letter-ballot must be new business, I should say, and would certainly come under that heading at some other time during this meeting.

The SECRETARY.—We have new business on our schedule after the reports are received.

Mr. WHITTEMORE.—That would be perfectly satisfactory.

Mr. M. J. BECKER.—The Committee appointed by resolution of the Society in June last, to investigate the causes of the failure of the South Fork Dam have about finished their labors, and at the meeting held in this city yesterday, at which all the members of the Committee were present, they unanimously agreed upon a report, which report, with the exception of a few incomplete maps and drawings, would be ready for submission to the Society at this meeting; but for some reasons which I will state presently the Committee have considered that the publicity of this report at this time would not be the proper thing. Lawsuits involving claims for very heavy damages have been instituted by part of the sufferers from the disaster against the South Fork Fishing and Hunting Club, and these suits are now pending in the courts of Pennsylvania, and the Committee, therefore, thought that to give publicity at this time to their conclusions might prejudice the case and have a tendency to affect the issue of the trials. The Committee have, therefore, agreed to recommend to the Society that the report as agreed upon, fully signed, endorsed and sealed, should be placed in the custody of the Chairman of the Committee, Mr. James B. Francis, and kept there to be called for at any time after the issue of the trials in court has been decided, and the Committee trust that the Society will agree with these views of the Committee, and endorse their recommendations.

Mr. A. M. WELLINGTON.—May not that seal up the report a good many years; may not those trials continue six or seven years?

The PRESIDENT.—It is entirely impossible for the Chair to give any opinion regarding the duration of trials in the Pennsylvania courts.

Mr. WHITTEMORE.—I move that the suggestion be approved. We can see where reports of committees are liable to take us. (Seconded.)

Mr. J. G. SANDERSON.—I suppose this report will be a purely scientific report. The opinions of engineers have, I think, very little to do with juries; and lawyers in a court of law very seldom regard the practical matters to be considered. I have had some experience with courts of law in Pennsylvania, and if this report is to be sealed pending a decision of the courts it will probably be sealed indefinitely. I move that the report be received and published.

Mr. A. GOTTLIEB.—I think the recommendation of the Committee is a very good one. We do not know how long these trials may last, but

the report should be kept sealed, and I offer an amendment to the motion of the Committee—that this report be kept sealed until a decision in the first instance in the lower court is made, and not until the final decision in the upper court is made.

Mr. E. P. NORTH.—It seems to me that a good many thousands of dollars are involved in extra fees to lawyers, engineers, etc., on one side or the other, and I do not see why this Society should make a present of them to the litigants. I hope that the original motion will prevail, and the report will stay tied up until the matter is settled.

Mr. SANDERSON.—If that is the only use that can be made of this report, why was the Committee organized at all? If the Committee was appointed to make this investigation and report, why should this report be suppressed? What is the use of organizing the Committee and of going through all the work, and then suppressing the report.

Mr. BECKER.—The chief reluctance of the Committee consists in the feeling that the publication of the report would appear as if we were offering expert testimony pending a judicial proceeding.

Mr. WHITTEMORE.—The Society, having made a mistake in appointing a committee in the first place, takes the opportunity of correcting itself. I may say that I think it was a mistake in the first place for us to medde with this matter.

The PRESIDENT.—There seem to be two motions before the house, and an amendment to the first motion.

The SECRETARY.—The amendment was by Mr. Gottlieb. Mr. Gottlieb's amendment was to await the decision in the lower court—the first decision; that has not been seconded that I have heard.

Mr. SANDERSON.—I think that my motion, which was first made, was seconded—that the report be received and published. We can afterwards consider the amendment.

The SECRETARY.—Does that mean the report just made by the Committee, or does it mean the report which that report recommends should not be published? As I understand the matter, the Committee has made a report, stating that there was a report in the possession of its Chairman, which was sealed up and recommending that that report be not at present published; that is the report which we have before us now. Is that the report to which you refer?

Mr. SANDERSON.—No, sir.

Mr. G. LEVERICH.—Is that report in the hands of the Committee or in the hands of the Society?

The PRESIDENT.—In the hands of the Committee at the present time.

Mr. BRUSH.—As I understand, the Committee make a report of progress; as that is the report of the Committee, I move that the report be received and their action approved.

I fully agree with the remarks that have been made, that during

pending litigation the Society should not commit itself. I, therefore, move that the report of progess made by the Committee be accepted, and that their action in not presenting their final report be approved.

Mr. WHITTEMORE.—That is substantially the motion first made by myself, before Mr. Sanderson's motion and seconded by Mr. North.

Mr. NORTH.—It seems to me the only way is to put the first motion and settle that, and afterwards put any motion that may be made, unless you can get the first and second withdrawn.

The CHAIR.—The question is on the motion of Mr. Brush. Mr. Whittemore accepts the motion of Mr. Brush. (Vote put. Carried.)

Mr. SANDERSON.—I take it that is the end of it; the report is now in the hands of the Committee, and they can keep it as long as they please.

The PRESIDENT.—The Committee is subject to the call of the Society at any time. They may see proper, if called upon in the future to still make excuse for not rendering the report at that time, but the Committee is subject to the Society, and the Society is entitled to the report at any time they see fit. Of course, under this motion, the Committee is continued.

The PRESIDENT.—The next business in order is the report of the Committee on Uniform Standard Time. (Mr. Fleming read the report.*)

The PRESIDENT.—What action shall be taken upon the report of the Committee?

Mr. SANDFORD FLEMING.—I might explain that, without wishing to be in any way officious, the Committee have thought it well to prepare a draft of the memorial recommended by the report which possibly the Society may approve. If it is the pleasure of the house I will read the draft of the memorial. (Read the draft of memorial to Congress.*)

Mr. FRED. BROOKS.—I think this is the proper time for me to say that I have a supplementary report touching some points in addition to those in the report which I have read and which I have signed. (Mr. Brooks read his supplementary report.*)

The PRESIDENT.—What action shall be taken regarding the report of the Committee on Standard Time?

Mr. FLEMING.—I regret, sir, that some of the members of the Committee who desired to be here are unable to come until a later hour; I do not know whether it would be desirable to postpone discussion until that hour or to take action now.

The PRESIDENT.—If there is no objection we will postpone further action on the report until after lunch.

The next business in order is the report of the Committee on the Revision of the Constitution. That report was presented at the meeting of November 6th, 1889.†

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*See subsequent pages. † See Proceedings, November, 1889, page 158.

The SECRETARY.—Mr. Shinn is Chairman of that Committee and is not present. (Printed copies of the report with the proposed Codification of the Constitution were passed around and the Secretary read the report.)

Major MICHAELIS.—I regret very much the absence of the Chairman of the Committee. Mr. Shinn intended to be here, but very severe illness in his family kept him in Pittsburgh. As Secretary of the Committee, I desire to say a few words.

This Committee was appointed during the summer. It consisted of three Resident Members and four others, two representing the West, one the South and one the New England States. At the first meeting all the members were present and a long and harmonious session was held. At that time it appeared at once that it was impossible to do this work with the present Constitution, good as it is, in its present form, because if the Committee presented some amendments which would meet the approval of the Society, it might present others not approved by the Society, and, as a consequence, the work must be accepted as a whole or not at all. Therefore, it was unanimously determined that the very first thing to be done was to codify the present Constitution; simply arrange under proper headings the present law. Nothing else was done, and I want to say, personally, I think the Society owes a debt of gratitude to two of its members, Messrs. Brush and Collingwood, who devoted their summer vacation to this work.

Now, there is nothing whatever in this Codification that changes the present law; that should be distinctly understood. So far as I know there is not a word changed, except where a conjunction had to be put in in consequence of uniting the present clauses of the Constitution; it is simply a change of form. The Committee feel that they cannot make amendments to the present Constitution with any idea of success unless the Codification is first adopted. The Committee—unless you take other action to-day—will continue their work, and this would be their report.

The Committee further consider that unless the present Constitution is changed their report could not be presented until the next Annual Meeting; that would prevent action until the next year, 1891; therefore, the Committee deemed it well to submit an amending clause to the present method of amending, which simply gives members of the Society the privilege of presenting amendments, under the same code of rules that exists now, at the Annual Convention. You must remember that the amendments submitted by this Committee are really only the amendments of members of the Society; they have no different standing; they are exactly on the same basis as amendments submitted by any five members of the Society.

The Committee are anxious that you should understand that they present no amendments to the Constitution, but simply ask you to do something that will enable the Constitution to be amended.

Mr. BRUSH.—I would like to say just a few words on this subject. In the first place I offer a motion that the action of the Committee be approved and the Codification and amendment as suggested by them be sent out to letter-ballot and the Committee continued. If that is seconded, I would like to say a few words. (Seconded.)

Major Michaelis has dwelt strongly on the fact that this Codification in your present Constitution is without change. It may seem to some of you that at this stage some amendments which are perfectly palpable and necessary should have been presented. Since I have been here two or three members have called my attention to verbal changes even in the Codification which would be desirable; others have mentioned certain changes in the Constitution itself. I want you to understand that the Committee have distinctly in hand the consideration of the verbal changes and the changes in the Constitution itself; they are proceeding very carefully in the matter and do not care to make a report until they make a complete report.

A number of committees have been appointed by other societies for the purpose of consulting with this Committee. If any of the members of those committees are present, this Committee, if it is continued, will meet with them. I mention that now, because if any committees are here we would like to meet them.

The Committee feel that the best way is simply to take action to-day on the Codification and leave the whole question of amendments and discussion of amendments until the time when they are able to make their complete report. I feel very sure that these endless discussions on the Constitution have affected our Society during the latter part of last year, and when we have the discussion, let us have it altogether. If there is any suggestion that any members feel they would like to put before the Committee, or anything they would like the Committee to consider, we would be glad to hear it, but the Committee would be sorry if the Society here to-day feel that we should take action on certain amendments which seem to them important, which the Committee feel should not be acted upon until the report is complete. (Question called for.)

The PRESIDENT.—You have heard the motion of Mr. Brush, which I presume means simply to send to letter-ballot the Codification together with the proposed amendment of Article IX of the present Constitution, in the regular way prescribed in the Constitution, and that the Committee be continued. (Vote put; motion carried.)

The PRESIDENT.—The suggestions which have been received as to the time and place of the next Convention will be read by the Secretary.

The Secretary read a *résumé* of the replies, as follows:

Ithaca (Cornell University), 29; San Francisco (California and Pacific Coast), 18; Chicago, 15; Washington, D. C., 11; Pittsburgh, 8; Boston, 7; St. Louis, 7; Atlanta, Ga., 5; New York City, 5; White Sul-

phur Springs, Va., 5; Kansas City, 4; Old Point Comfort, 4; Cincinnati, Cleveland, Mackinac Island, Montreal, Portland (Or.), Thousand Islands, 3 each; Birmingham, Detroit, Halifax, some place South, Memphis, Minneapolis, Nashville, Seabright, St. Paul, Niagara Falls, Louisville, Denver, 2 each; Atlantic City, Augusta (Me.), Baltimore, Bluefield (W. Va.), Bangor, Charleston, Chautauqua Lake, Chattanooga, Coast of Maine, Crawford House (White Mountains), Duluth, Greytown, Nicaragua, Helena (Montana), Mexico, Milwaukee, Nantucket, Newport, Norfolk, Lookout Mountain, Lake Superior Region, Lake George, Philadelphia, Poughkeepsie, Saratoga, Toronto, St. Augustine, Yellowstone Park, 1 each.

The PRESIDENT.—We would like to have an expression of views in regard to the time and place of the Convention from the members present.

Mr. F. COLLINGWOOD.—I move that the subject be referred to the Board of direction. (Seconded.)

The CHAIR.—It is moved and seconded that the subject be referred to the Board of Direction.

Mr. SANDERSON.—Would not it be desirable to have some discussion to get the sense of the meeting at the present time?

Major MICHAELIS.—You will remember at the last Annual Meeting I suggested that the Convention of 1889 be held at Bar Harbor or Mooseland Lake, Maine. At that time that suggestion was very favorably received, and many members came to me and expressed their approval of the project, but thought that in view of the impending European exodus it might be well to postpone holding the Convention there; they deemed it desirable to have a local convention the past year.

I will not attempt to repeat the arguments I presented last year; as I said then, we can offer nothing of engineering interest to you, but we can insure that you will have a good time. Such a convention would be purely a social one.

There need be no apprehensions in regard to accommodation no matter how large the attendance may be, when I tell you that the third great industry of the State of Maine is summer boarding. I understand also that we can have the most favorable railroad facilities; the interstate commerce law does not apply in the State of Maine.

Roughly outlined, my own idea would be to have the Convention meet in June, and I think we can offer attractions enough. We could meet at Bar Harbor and take excursions to St. Andrews and St. John, and those who desired could go to Halifax. I think we could arrange that the whole Convention could be taken to Moosehead Lake; the hotel there will accommodate 500 people, perhaps more. I think it is not necessary for me to say more; you want to bear in mind that it will not be an engineering Convention at all, purely a social one.

Mr. BRUSH.—If the matter is to be referred to the Board of Direction

there will be opportunity for as many suggestions as possible, which should be sent in as soon as possible. One point I want to dwell upon; there should be ample hotel accommodation. It is absolutely essential to the success of the Convention. The largest number of votes cast were for Ithaca, Cornell University. I have no doubt there are many attractions at that point. My own knowledge of the accommodations is limited, but from what I have learned I should judge that the accommodations are very limited, and we would be obliged to separate and stay at different houses; in that case the success of the Convention would certainly be imperilled.

The advantages of New England, Maine especially, have been ably set forth. Many of our members have suggested the South, and I would call attention to Fortress Monroe, with its great hotel, which offers many advantages, and Chattanooga also should not be ignored. But wherever we go, let us go where we have large hotel accommodations, as we had last year.

Mr. WHINERY.—Among the suggestions are quite a number recommending southern points; the Convention has not met for a great many years south of the Ohio River. In view of the great industrial progress and the rapid development of the South I think that the members would find in that region a great many attractions. I am not, however, authorized to speak for any one point. With a view, possibly, to the Convention for next year, I may say that there is being built on Lookout Mountain what promises to be a very large and excellent hotel. Lookout Mountain has no superior in point of location, and I would suggest to members present to bear in mind, for the Convention of 1891, to propose Lookout Mountain as a place for the Convention.

The SECRETARY.—I rise, not to take part in this discussion personally, but to read a letter which I have received and which I think the Society ought to hear, from Professor Fuertes. Professor Fuertes wrote me that he would like to have the Society meet at Ithaca. I wrote him that while there was no question as to the attractions which that great university would offer to the members of the Society visiting it, yet I knew very emphatically that unless proper hotel accommodations could be provided for our members and their families, the Convention would not be a success.

The letter is as follows:

"Of course our hotels are country inns; but they are comfortable, and when special arrangements are made beforehand, they can furnish excellent accommodations. The Ithaca hotel has an elevator, electric bells and lights and an excellent cuisine. It has accommodated about two hundred persons during Commencement time; but a further investigation into the case, in view of your cautionary letter, reveals the fact that seventy-five persons can be accommodated with single rooms. The furniture is new and bedding unexceptionable. By putting two separate beds in some of the rooms, one hundred and five guests can be supplied

with very comfortable quarters. The Clinton House can furnish forty single rooms. There are several other hotels in the town proper that I do not think very desirable; but on the hill at the Sage College (see accompanying map) one hundred and twenty young ladies live with very great comfort; but supposing that it be given up for the use of the most prominent visitors, say, eighty single rooms can be made ready. In this manner one hundred and ninety-five single rooms may be depended upon; but also. there are three or four new buildings, put up recently as students' hotels (the Brunswick, Belvidere, etc.), which are within three minutes' walk from the University, that could accommodate thirty-five or forty additional guests with very good fare and lodging. These places are indicated in the map by a [illegible]. My proposition would be to have members take their breakfast and late dinner at their hotels, spending the entire day on the University grounds, where they can remain easily a week without exhausting what may be seen in them. The Sage College (see map) is an immense building provided with spacious parlors and offices, where the members could roam, consult and wander at their sweet will, and is connected to beautiful green-houses where superb things from all climates grow.

"The dining-room of this building can furnish luncheon to the entire membership, besides full board to its guests. Right across from the Sage College, and so near to it that you can converse with persons in the next building, is the Young Mens' Christian Association, or Barnes Hall (No. 38 on the map). There is here a large hall, which holds an audience of about 800 persons, provided with opera chairs on a slanting floor, and a stage or platform where one hundred persons can sit. This hall, by means of glass screens, can open into another hall with opera chairs for two hundred persons. It contains in the lower story a large parlor, with sumptuous furniture, carvings, etc., and several rooms for offices and committee work. In fact no more suitable building could be devised for the purpose of facilitating business, consultations or the pleasure of members; for, in addition to the view of the town beneath, the head of the valley to the south, and the ground view of Cayuga Lake towards the north, is one of the finest and most striking landscapes to be found anywhere. There is an abundance of room where members could meet for social or other purposes. The distance from Barnes Hall to the furthest hotel can be walked in twelve minutes with ease, though there are omnibuses at all hours in ordinary times, and arrangements may be made to have them at any time without having to order them. I fear I shall be unable to be in New York to present the case in person, being quite ill in the grip of 'La Grippe;' but I desire to say that if the Board of Direction decide to come to Ithaca, I shall try, with my colleagues here, to render the meeting as successful as effort can make it. With best wishes, I am sincerely,

"E. A. FUERTES."

Mr. BATES.—I would like to suggest a place that does not exist at present; I refer to the location of the World's Fair. Wherever that may be it is certainly a place that every member of the Society will want to visit, and it certainly will be a place where there is ample hotel accommodation.

The SECRETARY.—The World's Fair does not occur in 1890.

The PRESIDENT.—Any further suggestions ? The motion is that the selection of the locality and the fixing of the time for holding the next Convention be referred to the Board of Direction. (Carried).

The SECRETARY.—The tellers for the ballot for the election of officers for the ensuing year request me to read their report, as follows:

Total number of ballots received, 256.

For President: W. P. Shinn received 246; O. Chanute, 1; A. Fteley, 1; J. P. Davis, 1; Charles Macdonald, 1; Thomas F. Rowland, 1; Thomas C. Clark, 1; J. J. R. Croes, 2.

For Vice-Presidents: A. Fteley, 251; Mendes Cohen, 251; W. P. Shinn, 1; Charles E. Emery, 1; Rudolph Hering, 1; P. F. Brendlinger, 1; Frederick C. Weir, 1; B. F. Church, 1; Charles Macdonald, 1; William E. Merrill, 2.

For Secretary and Librarian: John Bogart, 253; F. Collingwood, 2; Mansfield Merriman, 1; E. P. North, 1.

For Treasurer: George S. Greene, 253; W. H. Wiley, 1; Arthur M. Wellington, 1; J. J. R. Croes, 1.

For Directors: Charles B. Brush, 255; Theodore Voorhees, 256; Robert Van Buren, 256; William Ludlow, 253; William G. Curtis, 254; F. P. Stearns, 1; O. H. Landreth, 1; Clemens Herschel, 1; J. J. R. Croes, 1.

Respecfully submitted,

ROBERT CARTWRIGHT,
A. D. FOOTE,
Tellers.

The President then announced that the following named Members were duly elected officers of the Society for the ensuing year:

President: William P. Shinn; *Vice-Presidents:* A. Fteley, Mendes Cohen; *Secretary* and *Librarian:* John Bogart; *Treasurer:* George S. Greene, Jr.; *Directors:* Charles B. Brush, Theodore Voorhees, Robert Van Buren, William Ludlow, William G. Curtis.

The Secretary read the report of the Tellers on the ballot for membership. The following candidates were declared elected. As Members: Robert Linah Cobb, Louisville, Ky.; Benjamin Douglas, Detroit, Mich.; George McGrew Farley, Boston, Mass.; Anthony Erneste Bernhard Feind, Chicago, Ill.; Louis Frederick Fieser, Indianapolis, Ind.; James Kennon Geddes, Zanesville, O.; William Tillottson Gould, St. Louis, Mo.; Henry Randolph Holbrook, Pueblo, Colo.; Lingan Strother Randolph, Mt. Savage, Md.; Merritt Harrison Rogers, Pueblo, Colo.; Robert Delos Rowe, East Las Vegas, N. M.; John Herbert Wallace, San Francisco, Cala.; Henry Fisher White, Cedar Rapids, Ia.; Herbert Michael Wilson, Washington, D. C. As Juniors: Morton Lewis Byers, New Castle, Pa.; John Francis Healy, Fayetteville, Tenn.; Rudolph Phillip Miller, Richmond, Va.

The SECRETARY.—Gentlemen, the American Institute of Electrical Engineers has for some time been meeting in our rooms. We have been very happy to aid that Institute by offering them the courtesies of our house. Two representatives of the Institute, Mr. Pope and Major Michaelis, are here, and I beg to have the pleasure of introducing them.

Mr. RALPH W. POPE.—Mr. President and Members of the American Society of Civil Engineers, as Secretary of the Electrical Engineers, it has been my duty to do a great deal of hard work, and on occasions of this kind, when anything ornamental was to be done, I have felt that there were others who should come forward and do it, but, unfortunately, some of the members of the committee have been called away, and it therefore becomes my pleasure to represent, so far as may be possible, the American Institute of Electrical Engineers on this pleasant occasion. About six years ago that Society was organized, and I may say that at that day in professional work we did not stand as near the Civil Engineers as we do to-day. I wish to say that on occasions where we are permitted to spend plenty of money and devote plenty of time we would obviate many of the accidents that are placed to the credit of electricity.

Your Society and your officers have afforded us every facility, have given us words of encouragement from that day to the present time, and, from surface indications, it appears that the same cordial feeling will continue to exist hereafter.

On Christmas Day I had the pleasure of spending an afternoon with one of my old friends, and he said a happy thought had come to him in connection with giving Christmas gifts to his wife; that he always presented her with something nice that could be used in the house, so he could participate in the benefit.

It occurred to the members of the Institute of Electrical Engineers that, in view of the handsome mantel that is in the end of this room, it would be the proper thing to do to place in it something ornamental and useful, and something that we could look at when we came here. We could not find anything quite substantial enough for Civil Engineers, so we have designed these fixtures and had them made, and, as bunglers, we have left an ample margin of safety.

Gentlemen, it gives me pleasure to present to you these fixtures, with the hope that the warmth that permeates through them may represent the feeling that has grown up between us as fellow engineers.

The PRESIDENT.—On behalf of the American Society of Civil Engineers, I take great pleasure in accepting these gifts from our electrical brothers, and I hope they are not charged with electricity.*

The meeting will now adjourn for lunch, to reassemble at 15 o'clock. (Adjourned.)

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* The presentation was of a complete set of very handsome and massive wrought-iron grate fixtures.

AFTERNOON SESSION.

The PRESIDENT.—This morning the matter that was postponed until after luncheon was the consideration of the report of the Committee on Uniform Standard Time. It was moved and seconded that the report of the Committee on Uniform Standard Time be accepted.

Mr. WHITTEMORE.—In that resolution it was designated that the Committee be continued. We would be very glad to have the Committee continued. I would add that as an amendment.

Mr. FLEMING.—I think Dr. Egleston, a member of the Committee, has something to say.

Dr. EGLESTON.—Does not this first resolution require to be passed first?

The PRESIDENT.—It is moved and seconded that the report that we have heard read by the Chairman of the Committee be adopted and the Committee continued. (Carried.)

Dr. EGLESTON.—I wish to offer the following resolution with respect to the memorial to Congress:

Resolved, That the recommendation of the Committee with respect to a memorial to the United States Government be adopted; that the report of the Committee, with the draft of the proposed memorial, be submitted to letter-ballot for the approval of the Society, and, if approved, that it be attested on behalf of the Society by the President, the Secretary and the Board of Direction, and duly presented at Washington.

Mr. WHITTEMORE.—I second that motion.

Dr. EGLESTON.—I wish to say in regard to this motion that the United States invited a number of nations to assemble at Philadelphia, that a report was then made, and that since that time no action has been taken. International courtesy requires that the first Government to move shall be the Government which called the Convention. Our government has not moved in the matter, and while other nations are making great progress, no movement will be made in this direction until our Government makes the motion. It seems to me that this Society is the proper one to take the initiative step. It has done so much work already that it is eminently proper that the Society should take such a step as this with a view of having the whole matter recommended to the other governments, so that the other governments may move if they wish.

Mr. NORTH.—Could not this resolution be passed without putting out a letter-ballot? Is not this meeting competent to pass the resolution?

Dr. EGLESTON.—The resolution was worded in this way because it was supposed that it could not be adopted by the Society without a letter-ballot. Of course it would hasten matters very much if it could be adopted at this meeting. Besides there was some doubt in the minds of the Committee whether this was not "an engineering matter."

The PRESIDENT.—There is nothing in our organic laws that would

require that a mere resolution should be submitted to letter-ballot. I think the meeting to-day is perfectly competent to act.

Dr. EGLESTON.—Then I would like to amend the resolution by striking out the part about letter-ballot.

Mr. WHITTEMORE.—I second the resolution as amended.

Mr. CHARLES EMERY.—It will be observed that the resolution duplicates the action of the former resolution, already adopted; as I understand it.

The PRESIDENT.—The motion would then read this way:

That the recommendation of the Committee with respect to a memorial to the United States Government be adopted; that the report of the Committee, with draft of the proposed memorial, be attested on behalf of the Society by the President, Secretary and the Board of Direction, and duly presented at Washington.

Does not that cover the case?

Mr. EGLESTON.—That covers the case exactly.

The President put the last motion and it was carried.

Mr. FLEMING.—I would like to say that nine years ago the Committee was appointed, and during these nine years we have endeavored to the best of our ability to carry out the wishes of the Society. Our desire to do so remains as strong as ever. Our efforts are by no means exhausted. I am very glad that you have continued the Committee, and we feel that the new notation will be adopted throughout the United States shortly. I thank you on behalf of the Committee, and you may be sure that we will do everything in our power to carry out the wishes of the Society.

The PRESIDENT.—The addition which the Chairman proposes to make is simply that the Committee be continued and requested, with the co-operation and approval of the Board of Direction, to continue such efforts as they have already made. (This motion was carried.)

Mr. WHITTEMORE.—It has been suggested that it would be quite proper for a committee of this Society to go to Washington and present this resolution. I make that motion: that a Committee be appointed by the President to present this resolution relating to Uniform Standard Time to the proper authorities.

Mr. FLEMING.—In connection with that I would like to say just one word. Possibly the Board of Direction may wish to have one member of the Standard Time Committee on this Committee. I think that I would be unable to go myself, but for this purpose I would humbly suggest that my colleague, Dr. Egleston, be selected as Chairman for that special purpose.

Mr. CROES.—There is no necessity for such action by this meeting. The Committee have been requested to use every means in their power to forward the adoption of Standard Time by the resolution just passed. It would be entirely proper for them to proceed under that; to go before any committee or any departments in Washington and urge this matter

themselves and select their own chairman or person to represent them. It might be added that they be requested to go there, but under the resolution just passed, it seems to me they have the power to do it.

Mr. BROOKS.—They would go as the Committee on Standard Time. To present this matter in a dignified way, they ought to go as members of this Society, and for that reason we suggest for the proposed committee one member of the Standard Time Committee and that other members of the Society shall make up the rest of the committee. It seems to me it should be the whole body and not a committee of this body that should be represented; in the one case we should go on our own authority and without any authority to back us, whereas the main proposition of this memorial comes from the whole Society of Civil Engineers.

Mr. JOHN BOGART.—The resolution in reference to the memorial reads thus:

That the recommendation of the Committee with respect to a memorial to the United States Government be adopted; that the report of the Committee, with the draft of the proposed memorial, be attested on behalf of the Society by the President, the Secretary and Board of Direction, and duly presented at Washington.

I should think it was quite within the province of the Board of Direction to appoint the committee to go to Washington. They can appoint one of the members of the Standard Time Committee and any other members.

Mr. BROOKS.—That is the dignified way to do it.

Major MICHAELIS.—What has been done with the memorial—referred to the Board of Direction with power?

The PRESIDENT.—Yes.

Major MICHAELIS.—I want to call attention to the fact that the opinion of the Society cannot be officially given unless this resolution is submitted to letter-ballot.

The PRESIDENT.—What resolution?

Major MICHAELIS.—The resolution just discussed.

The PRESIDENT.—The rule refers to the appointment of special committees on engineering subjects.

Major MICHAELIS.—I merely asked for information. Do I understand that at any meeting of the Society, if a report be adopted at that meeting, it expresses the opinion of the whole Society? I think it is against the whole theory of our action for the last ten years, that the Society should not be represented as a body without having a proposition submitted to letter-ballot.

The SECRETARY.—I do not think that question has ever come up. I think it is a very interesting one. This Committee has, from time to time, made reports, and it was upon these reports that the Annual Meetings or conventions have for several years taken action. Upon the report of the Committee of a year ago all the railroads of the United

States, Mexico and Canada have been corresponded with, with the result of receiving replies from nearly 150 000 miles of railway, largely in accord with the suggestions of the Committee. Now, the Committee present a suggestion that a memorial shall be sent to Congress, and they present a draft of that memorial; one of our members suggests that the memorial be sent to letter-ballot; the President ruled that he did not think it was necessary, but that this meeting could determine it.

Major MICHAELIS.—I do not think that my point has been explained yet. I understand that this will establish a very important precedent. The Committee on Rail Sections will make a report at a meeting. Will that authorize the Society to memoralize the Congress of the United States to make a certain section the authorized standard section? I think there is no objection to a committee of the Society acting, but when you use the words "the American Society of Civil Engineers," with the request to memoralize, it seems to me that the members of the Society ought to have an opportunity to express their opinion by letter-ballot. This Committee wants the endorsement of the whole Society, and I think it ought to be presented in a proper way. It is an important question, and I would like to have the matter settled.

Dr. EGLESTON.—There would be great gain in getting the opinions of the Society, and there would be greater dignity if it go through letter-ballot. There could be no possible objection except that the matter would go through a little quicker if not submitted to letter-ballot, but I think the gain in dignity will very fully compensate for any loss in time, and it seems to me this matter is most important. I think everything is to be gained by a letter-ballot.

Major MICHAELIS.—I make the point that it is the policy of this Society that a resolution presented which involves an opinion cannot, in equity, be presented to any body unless it be first submitted to letter-ballot. That is an important matter, and I think we may as well decide it now.

Mr. CROES.—A number of members have thought for many years that questions affecting the policy of the Society, or engineering questions, should not be voted upon at simple meetings. In advocating this, the view taken as to this memorial by the Committee, I put it under this apprehension of the state of the case; that as we have approved the solution of the question of standard time and approved the action of the Committee, and the Committee have thought the time ripe, now it seems to me that the Committee ought to have the right of asking the co-operation of Congress in the matter. If this is a final report, and the memorial a question involving the opinion of the Society as a Society, and there is any chance of objection to the already strong expression of opinion of the Society in the matter, I think that it ought to go to letter-ballot; but if it is a continuance of what the Committee have done, merely carrying to another body the work they have been doing,

I do not see that there is any necessity for a letter-ballot. I think it is for the Chair to decide whether it is a question of policy or principle.

Mr. NORTH.—I would call attention to the By-Laws, Section 23, as already read during this meeting.

This Committee has been appointed, its reports have been received for four consecutive years. I do not see anything in the Constitution that prevents this meeting from deciding the question immediately.

Mr. CROES.—If it was a question affecting the policy of the Society in this matter I should say that the whole Society ought to be called upon to vote upon it; but this seems to be a question of the continuance of the work which has been carried on with the approval of the Society; just taking one step more in that direction, going to Congress instead of to the Board of Direction. The action of the Committee has met with the approval of the Society at the several stages in its progress, and this is not a new question, but a continuation of the old method and of the same policy. As I said before, I agree exactly with Major Michaelis, that if it was the appointment of a committee we would have to go to the whole Society, but it is merely the continuation of the action of the Committee on the same line in which it has been working; it is not necessary to go to the whole Society.

Major MICHAELIS.—I think the real question may be buried out of sight. The point I make is: the Committee can go to Congress; the Board of Direction, as a Board of Direction, may go to Congress; but here is a report of a committee which says that the American Society of Civil Engineers shall go to Congress, and I say that the Society cannot go to Congress until it has voted to do so. When we want the whole Society to go to Congress a letter-ballot is necessary. The Society cannot go to Congress unless it is told to do so by a vote of its members, and I hold that an ordinary meeting cannot control the Society. It is against our policy for the last ten years, anything which affects the Society always goes to letter-ballot.

Mr. PERCIVAL ROBERTS, Jr.—Is it not foreign to the purpose for which that Committee was appointed that that Committee even should go to Congress unless authorized to do so by a vote of the Society? Has the Board of Direction power to authorize the Committee to memorialize Congress without authority to do so? It may be proper in this instance, but in some other it may not be proper. It seems to me that it is foreign to the purpose for which this Committee was appointed; it was simply to report to the Society upon Standard Time. Now, if the Committee feel that it is proper to go to Congress, I think it would require a vote of the Society to send even the Committee there.

The PRESIDENT.—The meeting here has just passed a vote adopting a resolution, which reads:

That the recommendation of the Committee with respect to a memorial to the United States Government be adopted. That the report of

the Committee, with the draft of proposed memorial, be attested on behalf of the Society by the President, the Secretary and the Board of Direction, and duly presented at Washington.

Now, it seems to me that whether such an attested document goes by mail or by special messenger, or by any other means, cannot materially alter the case; the Board have had instructions to attest and forward it to Washington in some way for the information of the Government.

After this has passed Mr. Whittemore moves that we should send a special committee; which the Chairman of the Committee afterwards amends by recommending that a member of the Standing Committee be appointed on this special committee.

Now if that Committee which Mr. Whittemore proposes to send to Washington has nothing else to do except to go so far as what we have adopted, I certainly cannot see the propriety of going through the formality of sending the subject to a letter-ballot.

Mr. ROBERTS.—What right has this meeting to pass a memorial, which is a radical measure, and take this memorial on Standard Time as representative of the views of this Society? Must that not be sent to letter-ballot?

The PRESIDENT.—The Society has simply done it.

Mr. ROBERTS.—Then, I think, it has done something it has no right to do.

The PRESIDENT.—Had they a right to adopt the report? The recommendation of the draft of this memorial is simply a part of the report of the Committee, as I take it; the memorial is in the report.

Mr. ROBERTS.—It is a memorial to a foreign body. It would be all right for this meeting to accept a report, but that is something which is not a report to this Society but a memorial to another body which is entirely foreign to this Society. It would be proper to accept the report on Standard Time, but I do not think it is in our power to authorize a memorial to be sent by the entire Society to a foreign body.

Major MICHAELIS.—If we have done something that, on sober second thought, we find extra constitutional, there must be a simple way of undoing it. As a member of the Society, I am perfectly willing to refer this matter to the good sense of the Board of Direction. If they consider that they have the power to commit the Society as a whole to a memorial, I am willing to leave it to them, and therefore move the following, to supersede the motion of Dr. Egleston:

That the report of the Committee be received; that the thanks of the meeting be extended to the Committee for their able work; that the Committee be continued, and that their report be referred to the Board of Direction, with power.

Mr. ROBERTS.—I would amend that by saying that it is the sense of this meeting that it is very desirable to forward to Congress or tak

there in person such a memorial as the Committee has prepared. But the decision should be made by letter-ballot.

The PRESIDENT.—The report of the Committee will either have to be adopted in whole or not at all. This recommendation to memorialize the Government is part of the report, and if Major Michaelis' motion prevails, that the report be accepted, we simply accept the memorial with it.

Mr. A. GOTTLIEB.—I fully agree with the views of Major Michaelis and the other gentlemen who have spoken that we have no right to memorialize Congress or any outside body in the name of the American Society of Civil Engineers without having first submitted the question to letter-ballot. It is a precedent which we do not want this meeting to establish. We should then send a memorial to Congress only as an expression of the opinion of this meeting. If a committee be sent to present the memorial it will go before Congress as the American Society of Civil Engineers. Every member who is not here ought to have the right to express his opinion; it will have great weight before Congress. If we cannot accept this report as a whole, I think we can accept that report at this meeting and send the report as it is out to a letter-ballot to be voted on by every member.

Major MICHAELIS.—There is no objection to accepting the report of this Committee, including the memorial. If we adopt the report of the Committee the memorial would have to be accepted. We can accept the report of the Committee, and that adopts the memorial, but the American Society of Civil Engineers would still have to act upon it in a constitutional manner. I believe the constitutional manner is to submit it to the Society; we can adopt the memorial and still submit it to the Society for further action.

Mr. JAMES OWEN.—The point the Major alludes to was brought to the President's attention, and the Chair decided that it was in order for this meeting to take action on the report of the Committee, and they adopted it. It seems to me that all this talk is out of order.

The PRESIDENT.—The proper thing would be to reconsider the resolution.

Mr. JAMES B. FRANCIS.—Is not this the whole Society? We have all had notice to come to this meeting. Ordinarily, where a meeting is regularly announced, those present, if they are in a quorum, act for the whole body, who stand by it; I am willing to, as a general principle.

Mr. G. W. HOWELL.—Is there anything in the Constitution as regards such a resolution?

The PRESIDENT.—Will Major Michaelis point out to the meeting the clause of the Constitution to which he particularly refers and which would require the action which he recommends?

Major MICHAELIS.—The Committee on Revision of the Constitution

was appointed at the last Annual Convention. Their report has been before the Society for a month or more and yet it cannot be acted upon. Now here comes another Committee, and their report can be adopted and acted upon by the whole Society.

The PRESIDENT.—Under the Constitution no amendment to it can be voted upon except by letter-ballot.

Mr. W. E. WORTHEN.—Have we anything before the Society now?

The PRESIDENT.—The question before the Society seems to be simply whether the adoption by this meeting of the report of that Committee, which includes the memorial to Congress, adopts also the memorial, or whether it shall be reconsidered.

Mr. HOWELL.—Will Major Michaelis put his suggestion in the form of a motion before the house, then we can act upon it?

Mr. H. W. BRINCKERHOFF.—If there is no danger of muddling the matter any more, I would call attention to one fact. If we go upon the theory that every matter pending in the Society has got to be submitted to letter-ballot it will follow that the Society has no meetings that represent the Society. If the Society has any meetings, it certainly can act as a Society at this meeting.

Mr. WELLINGTON.—I move to reconsider the resolution to the extent of referring the matter to letter-ballot.

I must say that I think Major Michaelis' point is well taken. As a matter of law there is no question but that this meeting is the Society, but as a matter of custom it seems to me highly desirable that matters referring to outside action should not be decided here. While I thoroughly sympathize with the object of this resolution, yet I do not think it is in accordance with the custom of the Society to have a motion sprung upon it. I think it should be done in a formal manner.

Mr. FLEMING.—I beg leave to second the motion. We would really desire that it should be presented to Congress in the most proper manner. I hold the view that this meeting represents the Society. Still the memorial would be presented in a much more dignified manner if adopted by letter-ballot. I beg leave to second the motion.

The PRESIDENT.—The question is on the reconsideration of the measure adopted by the Society which would simply bring the matter up fresh. The adoption of the report of the Committee as well as the memorial to Congress just passed, would be the matter to be reconsidered. (Vote put; reconsideration carried.)

The subject is open for discussion now.

Mr. WELLINGTON.—I move that the report be accepted with the thanks of the Society, and that the memorial be referred by letter-ballot to the Society, and if passed by a two-thirds vote shall stand as the action of the Society. I think a two-thirds vote in a matter of that kind is of importance.

The PRESIDENT.—You cannot go outside of the Constitution. A majority vote is a vote.

Mr. WELLINGTON.—Very well. I withdaw the words two-thirds vote and substitute: if passed by a majority vote shall stand as the action of the Society. (The motion was seconded.)

The President put the vote. (Carried.)

The PRESIDENT.—Does Mr. Whittemore's resolution stand?

Mr. WHITTEMORE.—Until we know what the action of the Society may be it will hardly be in my province to make a motion. I withdraw the motion at present. We might make a continuation of the motion that in case it is adopted a Committee of our Society shall be appointed by the President to present the memorial to Congress. If that is proper I will make the motion.

Mr. CROES.—That will have to go to letter-ballot.

Mr. WHITTEMORE.—If you are going to raise that question again I will desist.

Mr. EMERY.—I will second Mr. Whittemore's mot'on. I think it would be well to leave it to the Board of Direction; still it is pleasant to have it adopted here.

Mr. WORTHEN.—Leave it to the Directors to carry out as they see fit.

The PRESIDENT.—I should think you could depend upon the Board of Direction to appoint that Committee.

Mr. WHITTEMORE.—I withdraw my motion.

The PRESIDENT.—The next business in order is the report of the Committee on the Impurities of Domestic Water Supply.

Mr. L. B. WARD.—To avoid any misapprehension as to the report being a final report, I request that the Secretary read the resolution appointing the Committee.

The SECRETARY.—The resolution presented at the business meeting at the last Convention, and afterwards adopted by the Society by letter-ballot, is as follows:

Whereas, It is a well known fact that many cities and towns on the Atlantic coast have suffered very greatly from impurities in their water supplies, due to various causes, and that no adequate remedy, meeting all conditions, has been found therefor; and,

Whereas, These impurities are often due to natural causes which have not been adequately investigated on account of the difficulty of centralizing the individual efforts of all parties engaged in said investigations;

Resolved, That a Committee of three members of this Society be appointed by the President, to ascertain the best means of concentrating all obtainable information in such a manner as to secure useful results, and to report to the Annual Meeting of this Society what further action, in their opinion, should be taken in the premises.

The PRESIDENT.—What disposition shall be made of the report of this Committee?

The Secretary read the report of the Committee.*

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*See subsequent pages.

Mr. FTELEY.—I for one have heard with a great deal of interest the reading of this report. The Committee have evidently studied the questions referred to them with a great deal of care, and we know that some of the members of the Committee are authorities on the subject. I understand from this report that the Committee considers its task performed; the view taken by the Committee is fully in accordance with the resolution, the wording of which was possibly a little less explicit than it should have been.

We all know how difficult it would be for this Society to find members with time enough on their hands to look up such matters, especially to the extent suggested by the Committee. But if the Society cannot take up those questions in that fashion, it would appear that the resolution can be understood as meaning that a committee of the Society might correspond with those who have charge of water-works, those who have been troubled by impure water, and obtain such information as would lead the Committee to believe that there might be a way of gathering all the information from all quarters of the United States in order to profit by the experience of all. The Committee has mentioned the fact that the Board of Health of Massachusetts has already entered very largely in a work of this kind; they have done magnificent work, as may be seen by their reports, but it is limited to Massachusetts. The troubles experienced in New York and elsewhere are not the same as in Massachusetts. It would seem that if there were any means by which all the profession can have the benefit of the experience of all the others in all parts of the country, there certainly would be a great advance. The great difficulty lies in the executive body of men that would look into these matters. I do not believe the Society could do that, as the Committee does; yet I believe as they do, that the Society, of all the professional bodies, is the one to obtain information.

You may ask who is to pay for it. Evidently not the Society. A research of that kind would require considerable money; it would not be beyond the means of a concentrated fund collected from many persons or bodies. It seems to me that a committee of the Society should correspond with the bodies of people interested in this matter and ask them whether they would like to receive information, and whether in their opinion they could not ask a small sum of money; whether it could not be provided by such cities, by such States, so as to enable an organized body of men to expend $20 000 or $25 000 a year. Under what auspices would that money be spent? Certainly not under the American Society of Civil Engineers; but where so many people are interested in such a subject all these people together could appoint a governing committee to form such a bureau, and then the function of the Society would have been performed. The Society would have enabled the professional world to secure by its enterprise a great boon. It seems to me that this is the only way that the Society could enter into that line of

inquiry. I see that, in many respects, what I have said corresponds with what this Committee have reported. I believe that the function of such a committee would not be of a scientific character; it would be a committee of inquiry, to report to the Society whether something can be done; then the Society can take such further action as they may find necessary or advisable.

To come to a conclusion, I should say, that as this Committee ask to be discharged, the Society prepare some new instructions in the sense that I have tried to explain to you, if it meets the views of the Society, and that a new committee be appointed, which could include either the same members of the present committee, or some of them, or entirely new members, at the option of the Society. I might add that I offer that resolution because I feel that the subject is so important that it ought not to remain where it is.

Mr. WARD.—If in order, I move that the report be accepted, the matter referred to the Board of Direction and the Committee discharged. (Seconded.)

Mr. BRUSH.—The subject is one of the most important that has ever been brought before the Society. It affects the life, the health, the business outlook of the whole country. The question of the water supply is not a luxury, it is a necessity. I can easily understand how any committee taking up this subject is aghast with the difficulties connected with it. I can understand that there can be a great difference of opinion as to the proper steps to be taken in order to arrive at a conclusion. It is a question that, except in one or two States, has not been considered at all. Where it has arisen it has been considered in the light of popular fanaticism. There is a tremendous excitement. People think that some special individual is responsible for it.

The scope of the inquiry as suggested in the report is one that is too great for the Society to undertake. The report is exceedingly able; it has presented the difficulties. The question is, what is the best thing for us to do under the circumstances. We certainly cannot go into an inquiry as extended as that suggested. I have my doubts whether the suggestions made by Mr. Fteley are practicable. I doubt very much whether this Society as a body ought to undertake any such expenditure, because for one reason a large number of the individual members of the Society are now engaged in studying the question, and do not want to be embarassed at all. We, as a Society, must not interfere with the action of our members, but it seems to me that if this Committee were continued and were instructed to prepare a circular in which a number of questions were asked to the effect of endeavoring to obtain information as to what places had suffered from this difficulty, and what were the peculiarities of the difficulty in that particular place, and what efforts had been made to remove the difficulty, and how far those efforts were successful, and correspond with every water-works in the country

and every State Board of Health and County Board of Health, it would be a mere question of postage on the circulars, and then when these answers are received, they should be properly collated and condensed, and the statement be made to the Society, and by the Society to the world. That would be about the extent to which that committee could go, unless it might possibly make a digest of the literature on the subject now, stating that there are so many hundred volumes on one particular branch, etc., in which most of these volumes are only a repetition of each other, and, so far as possible, state that such and such difficulties have been found under such and such circumstances. It would be a very great help not only to those engaged in the control of the difficulties, but to the public in general.

My suggestion would be this: that the report of the Committee be received with thanks, and the Committee be continued, with instructions to prepare a circular and send it to all those in charge of, or connected with, water supply in the United States as to the nature of the difficulty they had experienced, and what measures had been taken and with what success, to counteract this difficulty.

Mr. FTELEY.—I believe that Mr. Brush misunderstands a portion of my remarks. I never expected that the Society would spend money, except the few dollars necessary for postage. I simply meant to say that we would use the name of the Society to obtain information that otherwise could not be obtained. I do not believe that the Society should recommend anything in particular. It seems to me that this matter of circular is all very well, but that matter ought to be left to the Committee itself, and if the Society desires instructions given to the Committee, they have confidence enough in the Board to ask the Board to prepare instructions for the Committee. But I believe we would lose nothing by asking everybody interested whether in case of a general agreement there might be a possibility of combining into one a financial subscription for a bureau of investigation. Suppose we receive negative answers, we will have at the same time the information that Mr. Brush suggests, and it would be very good.

I would amend Mr. Brush's motion by saying this: I move that this report be received with thanks; that the Committee be continued, and whereas the earlier instructions are not explicit enough, the new instructions to be given to the Committee be left to the Board of Direction.

Mr. BRUSH.—I accept that amendment.

Mr. WARD.—The Committee have considered the matters that have been spoken of. I think that the course of action recommended by the Committee is one that comports with the character of the Society as a professional body. The investigation of changes of water is a very technical subject; it is not a subject for engineers exactly. But the line of that report is this, that the Society, through some committee or

organ as it may choose, should bring into the investigation and get the aid of the ablest micrologists and others who would furnish, without charge, I should hope, the Society with the results of investigations in such cases as might be brought before them. The Society would be in possession of that information, and as engineers deal with questions of water supply, I hope would be able to use it intelligently. As it is now, irresponsible scientists, men of considerable ability often, chemists, etc., are dabbling in this subject and assuming to know all about it, and their utterances are received with a great deal of respect by water boards and city water commissioners who are formulating plans for changes in water supply, and the duties of the engineering profession are very largely assumed by these people I speak of. They will ask them questions which certainly are engineering questions.

The question of money is covered in that report. The raising and expending a few thousand dollars in the collection and cataloguing of the literature upon the subject would give this Society a certain standing with the persons whose aid would be sought. Beyond that, I think that nothing need be paid for the collection of facts. I think that is the impression of the rest of the Committee as well as myself. I hope that my motion will prevail in regard to the discharge of the Committee.

Mr. L. Russell Clapp.—It seems to me that this is eminently a matter for the General Government. The General Government could handle this matter better than our Society. The General Government has numerous provisions well calulated for the examination of such a matter. I move that the report of the Committee be accepted with thanks; that they be discharged; that they draw up a memorial asking the Smithsonian Institution to investigate the subject.

Mr. Croes.—If we want to insure nothing being done at all that is the way to do it. This is a matter that the Society can take hold of and carry through. I do not see that the Committee have given us anything as to the best means of concentrating and obtaining information, except that they say, buy a lot of books. The issuing of a simple circular would concentrate a great mass of information which could be very easily digested. One of the members of the Committee, at least, asks to be discharged. Now, I think the Committee ought to be continued. If one member resigns the Board of Direction can fill his place; but I think the Committee have not reported the best means of obtaining ——

Mr. Ward.—They have reported what, in their opinion, is the best means.

Mr. Croes.—I said, "I think." I move that the Committee be continued. The committee can be continued very well without submitting the question to letter-ballot again. The motion, I believe, now is that the Committee be continued.

The President.—The original motion is for the acceptance of the

report and the discharge of the Committee, made by Mr. Ward; two amendments which, I understand, have been substantially agreed upon by the amenders, are to the effect that the report be accepted, the Committee continued, and the Board of Direction be instructed to issue instructions to the members of the Committee as to the mode of proceeding. I take it that these two motions, which are practically one, would be amendatory to the original motion, and would have to be seconded first.

Mr. FTELEY.—Before reading my motion I may be permitted to say one word. The last speaker but one has spoken of the advisability of putting this in the hands of the General Government instead of into the hands of the Society. I do not believe in the Society doing that work at all—I mean the Society at large.

My motion was that this present Committee be continued, with the thanks of the Society for the performance of their duties so far, and that new instructions be issued to the same Committee by the Board of Direction. (Seconded.)

Mr. WARD.—I think the Committee expires by limitation. They were instructed to report at this meeting; they have done so. They cannot very well be continued, it seems to me.

Mr. FTELEY.—I would say that the present instructions, as I understand the matter, could stand perfectly well as they are, and the additional instruction would be simply supplementary, or amending what has been said before.

Mr. WARD.—Were not those resolutions passed by letter-ballot? Can you amend such a resolution without another letter-ballot?

Mr. FTELEY.—That is a point not for me to decide. If any explanation has to be given as to the instructions—a better understanding of them—is not the Board of Direction the proper body to explain them?

Mr. WARD.—That is very true, if those instructions had come in before the Annual Meeting. But the thing is done. It is impossible to instruct the Committee any further, I think.

Mr. FTELEY.—I do not think that new instructions are at all incompatible with this. The Committee ask to be relieved of its duties.

Mr. WARD.—It has made its report.

The SECRETARY.—Suppose I read the terms of the resolution again. (Read the resolution as above.) That hardly seems to terminate the Committee, unless the Annual Meeting chooses to terminate it.

The PRESIDENT.—The meeting will certainly decide as to the continuance or discharge of the Committee.

Mr. OWEN.—There are two ideas in that resolution. In the first place, the Committee was appointed to do a certain thing; the next thing is the way to go and do that thing. It is for this Society to decide whether they will leave it to that Committee or refer it to a new committee. The whole question is in its inception stage, and cannot be stopped at this point.

Mr. FTELEY.—I think the Committee has done a great deal of excellent work. I should be very glad to see that Committee continued. I think it will have to continue in connection with the Board of Direction. The two will have to work together. There will have to be a concensus of opinion.

Mr. WARD.—That refers to a special committee.

Mr. FTELEY.—If the Committee would like to be continued and would be continued, I think the Society would like to continue it.

The SECRETARY.—Would we have to go to a new letter-ballot?

The PRESIDENT.—Yes; if the Committee decline in a body. I think that is the only recourse if all decline. The other fact being, the Board of Direction have power to appoint them, one after the other, amplifying the instructions, if it chooses to accept the power. (Question called for.)

The motion is to the effect that the report of the existing Committee be received with the thanks of the Society, and that the Committee be continued; that the Board of Direction be instructed to issue such further instructions to the members of the Committee as will tend to enlarge the scope of the investigation. (This motion was carried.)

New business is now in order.

Dr. EGLESTON.—I offer the following resolution:

Resolved, That the appointment of a Committee on Units of Measurement be submitted by letter-ballot to the Society. (Seconded.)

I wish to call the attention of the Society to the fact that there has been arising for the last three or four years a number of new methods which record measurements, and that these processes have upset all the old units of measurements and adopt entirely new ones. This subject has been before the Society of Mechanical Engineers for several years, and has been discussed by the Metrological Society. In the question of electricity, while perhaps more has been done from investigations in electrical matters made here there is not a single electrical unit that bears the name of any American. There are two Americans, Franklin and Henry, who ought to be recognized in this matter. There has not been a case, so far as I know, of the introduction of the name of a single American in such matters. It seems to me that not only in this but in other respects, there should be a standing committee on Units of Measurement who shall embrace in their duties not only the discussion of what the old units should be, but also new ones. It seems to me this Society is the competent one, and the one that should be represented.

The PRESIDENT.—Any discussion on Dr. Egleston's motion? I understand the motion to be that there be submitted to letter-ballot a resolution that a committee of this Society be appointed on units of measurement. (Rising vote taken; twenty in favor; none opposed. Carried.)

The PRESIDENT.—Any other new business.

Mr. WHITTEMORE.—I intimated that this afternoon I would offer a resolution; I will read that resolution.

Resolved, That the action heretofore taken for the appointment of a committee for the purpose of formulating and recommending to the Society standard rail sections, be rescinded. (Seconded.)

Mr. WELLINGTON.—I received a letter from Mr. H. Stanley Goodwin, asking me, as one of the members of the Committee, to represent him in case of any action coming up here. I do not suppose that he knew that anything of this kind would be proposed. I presume that he would have heard with some amusement the suggestion that it was improper to attempt to standarize the rail section. I will not raise the constitutional point which might be done that such a motion is entirely out of order. The Committee has been voted on in the regular way by letter-ballot. It is probably in the power of any one who voted for that Committee to move a re-consideration, but not for one who voted against it. The result of such action would be that some one opposed to a motion could put the same motion again and there would be no end to an opposition of that kind. It seems to me that Mr. Whittemore should find some one who voted for the preceding resolution to propose his motion.

The members cannot be expected to know all that was done by the Committee, the report of which has been presented and has been distributed in advance and which is now published in the Transactions, and I presume that it was in consequence of that report that the motion which resulted in the appointment of the present Committee was passed. I may properly rehearse the fact that your Committee on the form of rail heads developed the most surprising unanimity of opinion among the engineers of this country. Out of 64 replies there was a majority of nearly 10 to 1 in favor of nearly every important point that was submitted. There was, in the first place, the question of what was the best form for the top of the rail; on that question there was a vote, apart from the committee, of 45 in favor of the curved topped rails, including the Committee, that made 52 to 9. This is only an example of the unanimity which ran through the Committee's investigations. Now if it is proper for Mr. Whittemore, as an individual, to give gratuitous advice, as he chooses to term it, and for the Society to disseminate that at its expense, as proposed here, I certainly do not see why it is not proper to obtain the judgment of some eighty experts and publish that. I certainly think that ought to be as well within the Society's scope as the publication of individual opinion.

I may add that the same thing applies to the whole form of the head of the rail section; on that there was the most surprising unanimity. Now, as everybody knows, the head of the rail is where the difference of opinion comes in; all the other points have been already determined

upon, and it appears to me there is a great deal of unanimity of sentiment among the engineers of the country. My conviction is that there would be no difficulty whatever in getting nine men out of ten in this country whose opinion is valuable for its experience in favor of a standard series of rail sections, and I think it would be an immense boon to the country. If there is a subject proper for Society action I think it is this.

There is another view that Mr. Brush has suggested, that many members might be engaged in investigating this subject and would not want to be embarassed. I cannot understand the idea that a man who is investigating a subject would not like to know the opinion of a body of men; most of us who are investigating a difficult problem are glad to know the judgment of one hundred or two hundred men who are studying the same subject. It appears to me that very valuable results are likely to come from this movement. I have no doubt the Committee will pursue the same course which the old committee pursued, that was not to formulate their own opinion except as based upon a very large majority of the opinions brought out by the circulars. The Committee started with very diverse opinions on the subject, yet the whole Committee came to a remarkable unanimity of opinion.

Mr. BRUSH.—I do not know how far the subject I was speaking upon would compare with the subject that Mr. Wellington was speaking of. When I have studied five or six years upon a problem with relation to a particular locality I do not care to have the results of my examination embarrassed by a five minutes' consideration of a man of equal ability who has not studied that particular difficulty. How far such a feeling would exist in relation to rail sections I am not prepared to say. For instance, you will send out a circular giving a certain question and getting a certain answer, and you infer from that answer that that remedy would apply under that particular condition. I say that should not be put against my judgment.

Mr. WELLINGTON.—I agree with Mr. Brush as regards the subject of purity of water; that is a matter that a man has to study up himself. The same thing obtains in regard to foundations and many other matters, but there is no reason why a rail section which is good on one road should not be good on any road. At the present time there is not only a different rail section for every road, but for almost every mile. The recommendations of the late Committee have, I think, already done a great deal of good. There is absolutely no guide, and each man designs according to his best judgment and sends it to the rolling mill. There may be, as there actually is, nearly ten to one of the engineers of the country who agree, but they would like to bring out the fact of that agreement. Each man differs in these little details with the result that each man brings out a different rail section. It is not a question purely of engineering; it is especially a humanitarian question. It would

make a great difference if the employés of the rolling mills could be employed in slack times in the rolling of stock; if at these seasons they could roll for stock it would benefit all persons, the employé as well as the employer.

Mr. WHITTEMORE.—Perhaps what I shall say will be simply a repetition of the arguments I gave this morning. I cannot see the propriety of our Society becoming a school of design; that it should say through its committees how we shall form material for a particular purpose. I think that the Society is going beyond its legitimate field in attempting to design material; it is relegating to itself the duties of its members. We know that rolling mill companies and rail companies are very anxious to have uniform sections. Let their engineers devise them, and they will be responsible for any failure or any fault that may occur. Let *them* go on with this matter and formulate a standard for rail sections, and the American Society of Civil Engineers will not commit itself to any one.

Take the last report we have here. Reading that report, you would say at once that a certain form of rail cannot be successfully made, and yet that very form of rail that is condemned is made, and makes the best form of rail in the world.

The feeling that actuates me is that we are getting beyond the point to which we should go. We should not attempt to formulate through the Society a design for anything; that is the work of the member. We do not know where we will stop. Not long ago one of our members sent out a specification for bridges, and he wanted every engineering body to recommend it. I would like to hear the sentiments of the members here as to whether we shall have this committee.

Mr. SANDERSON.—I understand that the object of the Committee is to collate information and make recommendations. We are not obliged to adopt them.

The SECRETARY.—Read the resolution.

The PRESIDENT.—The discussion on the merits of this question would, no doubt, be of interest, and could be continued with profit for a great length of time.

I think Mr. Wellington has hit the nail on the head when he called attention to the provisions regarding this case. If you refer to the By-Laws, you will find that Section 2 provides that no motion for reconsideration shall be in order unless one of the majority shall move such reconsideration. A motion for reconsideration being put and lost shall not be renewed, nor shall any subject or vote be a second time reconsidered without unanimous consent. Now, unless the rescinding is something different from reconsideration, and unless Mr. Whittemore would state that he was one of the majority, or had his motion made by some member who was in the majority, I do not see how we can consider this.

Mr. WHITTEMORE.—This matter, I suppose, was passed at the Seabright Convention.

The SECRETARY.—It was passed by letter-ballot.

Mr. WHITTEMORE.—Is not the reconsideration of this merely rescinding our action?

I make the motion now to rescind the action that has already been had. It is not a reconsideration.

The PRESIDENT.—I must confess that I am not a sufficient grammarian in the English language to see the difference. If you rescind it you will only reconsider it.

Mr. WHITTEMORE.—This most positively means just what the word rescind means—to annul it. Of course, if this meeting decides to rescind, it will then have to go to letter-ballot to find whether it shall be rescinded, not reconsidered—rescinded.

Mr. H. B. SEAMAN.—Can we rescind it without reconsidering it?

Mr. WHITTEMORE.—As I understand, reconsideration is that after you decide to reconsider you do reconsider. This is to annul, to blot out.

The SECRETARY.—The question seems to be whether the motion to reconsider is to the same effect as the motion to rescind. If this motion was for a reconsideration, then the question would be: Shall the action of the Society appointing that committee be reconsidered? Mr. Whittemore claims that that would not be the motion which he presents. The motion which he wishes passed to letter-ballot would be: Resolved, that the action appointing that committee be rescinded, annulled. I think it is a fair parliamentary question.

Mr. WHITTEMORE.—If there is no way by which we can rescind any action that we may take, perhaps, intemperately, we are liable sometimes to make failures. It seems to me that this meeting has all the power that any other meeting has—that we can rescind any action that we have taken.

Mr. WILLIAM H. WILEY.—Would not Mr. Whittemore's idea be reached by a motion to discharge this Committee from further consideration of the subject?

Mr. WHITTEMORE.—I do not care how it is reached; only if we have a vote on this, then we will know whether the solid sense of our members here would be in favor of that resolution or not.

Mr. SAMUEL WHINERY.—This Committee was appointed by letter-ballot. Now, the question, it seems to me, is, has this meeting the right to rescind the action of the Society by letter-ballot? While there are no direct parliamentary rules perhaps on that point, yet I think there are only one or two kinds of motions that cannot be reconsidered, and it seems to me that the proper way to reach this would be to move to reconsider this action. This Committee was appointed for a definite purpose; it was appointed by letter-ballot, by the very highest authority in the Society;

it was appointed to consider this question and report. Now, has this meeting the right to change the whole intention of this action? I do not believe it has, and I think that the only practical way to reach this is to reconsider it. The matter can be reconsidered when it comes before the Society in exactly its original form, and then the matter can be settled.

The PRESIDENT.—That is the proper way to dispose of the question.

Mr. WHITTEMORE.—I have said that it is the sense of this meeting that the question of rescinding be passed to letter-ballot.

The SECRETARY.—Mr. Whittemore's resolution was that the question of rescinding go to letter-ballot. I should think that what this meeting could do, if anything, would be to order a letter-ballot taken on that; then the Society will say whether they want that committee exterminated or not.

Mr. WHINERY.—I think there is a nice parliamentary point involved there that perhaps requires the careful consideration of the Society. When the Legislature passes a law giving a company certain rights, the company acquires certain rights which, under certain circumstances, cannot be interfered with. Can the rights, the duties of that committee be interfered with except by taking it up anew?

The SECRETARY.—I merely suggest what would go to letter-ballot?

Mr. WHINERY.—I do not think it would be necessary to submit to letter-ballot the question of reconsideration; when that motion is passed, as it might be here, the question comes whether this committee shall be appointed.

The PRESIDENT.—The simplest way would be for some member of the majority to move for a reconsideration; then you are all right.

Mr. BRUSH.—I think I originally offered this resolution. I understood that there was perfect unanimity in relation to rail sections; since then I have learned that there is no unanimity in relation to the matter. The report shows that there is quite a considerable lack of unanimity in regard to it. We all know that when a letter-ballot is sent out everybody votes yes unless he has a special reason for voting no. Since then we have had an expression of a contrary feeling. I would like to have the opportunity of offering a motion now for a reconsideration of the vote of our Seabright meeting by which this matter was referred to letter-ballot by the Society. I move simply a reconsideration. (Seconded.)

Mr. WHITTEMORE.—In that case I withdraw my motion.

Mr. WELLINGTON.—The letter-ballot on the adoption of the resolution to appoint this committee was 218 affirmative and 35 negative. I am at a loss to imagine what Mr. Brush would call unanimity. How out of all the inquiries proposed to all the engineers in the United States and Europe there could be complete unanimity. There was practical unanimity. The Committee based its report on the majority. It is the first I ever heard of anything getting nearer to unanimity than that.

Mr. WHITTEMORE.—The vote shows that only about one-fourth of the membership voted, and the supposition is that everybody in favor of it voted for it.

The real point I shall make is this, that we are dealing with something that we ought not to deal with. I am in favor of committees to formulate methods of ascertaining facts and of ascertaining strength of materials, etc., but when you come to tell me how I shall put metal into shape for a practicable purpose, as that Committee will tell me, then I beg leave to say that you are doing the member's work. Another thing, we are not pecuniarily interested in this matter. Suppose you should find in a short time that you had made a mistake, and the railroad companies should say, well, we followed the advice of the American Society of Civil Engineers; suppose that railroad companies in following that design find that they are using a section which proves not to be the best; suppose something should occur like this that occurred to day, when you wanted to suppress that report on the Johnstown disaster, because you were dealing with something that the Society never ought to put its hands on, as a Society.

The PRESIDENT.—The question is on the motion of Mr Brush, which is to the effect that the action of the Society appointing a committee for the devising of a uniform standard for rail sections, be reconsidered.

A MEMBER.—Is it a vote to reconsider by letter-ballot?

Mr. BRUSH.—If this resolution is carried, yes.

The SECRETARY.—This simply directs the Secretary to issue another letter-ballot; opens the way to do it. (Rising vote taken; 23 in favor; 8 opposed.)

A MEMBER.—What is the question?

Mr. BRUSH.—The motion is the resolution:

Resolved, That the following resolution be sent out to letter-ballot;

Resolved, That the Committee appointed to report to the Society a set of Standard Rail Sections, of weights beginning at 40 pounds and advancing by increments of 5 pounds to 100 pounds per lineal yard, is hereby discharged, with the thanks of the Society.

A MEMBER.—Has that resolution been before the Society? I understand that the act of reconsideration is to take back the vote which has passed. What I understand is before the house now is the vote which was offered at the Seabright Convention.

Mr. BRUSH.—I therefore move that a letter ballot be taken on a resolution that this Committee be discharged with the thanks of the Society. (Seconded.)

In offering that motion I do so because I feel Mr. Whittemore is right in his principle. I do not consider myself sufficiently an expert to pass upon the rail question. What Mr. Wellington has said is true also, but the question of the rail section as suggested by the Committee is practically the whole rail section. The new rail section is one that has lately been considered and brought into use. I know of engineers who

are using the flat-topped rail section and think it is the only one to use, and I am not referring to any one in this room. If that is the case I am very anxious that this Society should not put itself on record against something which is uncertain. I think we ought to be very careful in adopting standards anyway. I offer this motion only because I happen to be one who voted yes on the original resolution. I want the Society to have the opportunity to vote the other way.

Everybody appreciates the great work the Committee has done; they have done magnificent work. But I am anxious to see if the vote will not be just the other way. I think the more we can impress upon our members that this merely putting a ballot in an envelope and sending it back is not a vote the better. I am very strongly inclined to think that you will find a vote of two hundred odd on the other side, simply because it is easier to vote yes than no.

The SECRETARY.—This would of course go to the Board of Direction to prepare the arguments for and against.

Mr. BRUSH.—Certainly it will take the usual form of letter-ballot.

Mr. BROOKS.—Is not this interpreted to be the reconsideration of what the Society voted upon before?

Mr. BRUSH.—Certainly; in the constitutional way we go back and reconsider that action first and move to reconsider, and finally, by a letter-ballot from the whole Society, reconsider. If we cannot do that it is a pretty serious case. The same power that we have to make a motion and carry it very certainly lies in the same body to reconsider.

Mr. WELLINGTON.—As the Chairman of the Committee is not here, I will say that the Committee is anxious to get at what the real sentiment of the Society is, and we, as a Committee, would be the last to oppose the reopening of the matter. But I think that, in order to bring out the real sentiment of the Society, it should be clearly apparent that this is a motion to reconsider and not a motion simply to discharge. I think the resolution should distinctly read that the action appointing such a Committee be reconsidered and the Committee be discharged.

The PRESIDENT.—That will be accomplished by sending the sense of the meeting to-day to each member; if they read the communication at all they will be informed.

Mr. BRUSH.—I accept that amendment distinctly—that the appointment of the Committee be reconsidered. I want it distinctly understood it is simply a question of reconsideration. The arguments will follow.

Mr. BRINCKERHOFF.—Perhaps I am only stating what Mr. Brush means, but I was about to suggest that in sending out this resolution it be accompanied by a statement of the reasons for and against.

The PRESIDENT.—That has to be done, under the Constitution.

Mr. BRINCKERHOFF.—On the appointment of a new committee?

Mr. WHINERY.—I think we are not getting this straight. This meeting undoubtedly has the right to reconsider a motion previously passed,

but we have not the authority to skip one motion and go back and consider another. There were two motions, one at Seabright, that this Committee be appointed; then that motion was submitted to letter-ballot of the Society—the only question that can be reconsidered. Then we are on the same ground, and the question must be submitted anew to the Society by letter-ballot.

Mr. BRUSH.—In what way does that bear on my resolution?

The PRESIDENT.—Mr. Whinery's point is that he wants the question of reconsideration submitted by letter-ballot to every member who voted in the first place.

Mr. WHINERY.—The object to be attained is to submit this question to letter-ballot.

Mr. BATES.—After we have reconsidered here, we just have the original motion as at Seabright, nothing else. Now that we have reconsidered, the only thing that we can submit to letter-ballot is the original ballot as given at Seabright.

The PRESIDENT.—I do not understand the question. As I understand Mr. Whinery, he wants to have the Society at large decide whether this question shall be reconsidered, and decide whether the letter-ballot shall be taken by the Society.

Mr. WHINERY.—This motion was adopted by letter-ballot. This meeting has no right to rescind it; in other words, it must be submitted to letter-ballot.

Mr. BOGART.—It seems to me, Mr. President, that the letter-ballot was intended to submit great questions of Society policy and all such questions as ought not to be decided by a gathering of a small number of members; that these questions should be submitted to letter-ballot, and it seems to me that it ought to be in the power of an Annual Meeting of the Society to determine whether a question of Society policy shall be voted upon by the Society. I do not see anything in the Constitution at all which interferes with that. It seems to me that it is perfectly competent for this meeting to say what, in the judgment of a large number of members who attend a meeting like this, is proper that the Society shall vote on by letter-ballot. It is not proper to ask them whether they want to vote, and then ask them to vote. I think such a course would complicate the matter so that the Secretary would have about 200 letters asking what it all meant.

I must confess that I doubt some of the parliamentary wisdom that has been brought out here. I believe that a motion to expunge is and ought to be a proper motion. It has been decided to be a new question. A motion to discharge a committee is never restricted by a motion to reconsider the vote by which that has been done. It is constantly occurring in Congress. If the Legislature or Congress considers that they want to stop the work of a committee a man gets up and offers a motion that the committee be discharged, and it is a new motion and is taken on

the affirmative. I believe it is entirely a new motion ; I merely say that incidentally. It does seem to me that we ought to have some way whereby, if this meeting considers that it is desirable to take a new vote, we ought to be able to say that much, that the meeting determines that the Society shall take the new vote on that proposition.

The PRESIDENT.—If the Society at large, after receiving their ballots, decide to abolish this Committee, of course the Committee is abolished ; if they vote to the contrary, the old motion of last summer prevails and the Committee attends to its business.

It seems to me that Mr. Whinery says, "I am going to resolve to get ready to do a certain thing ;" of course you have got to get ready, and you may as well say I am going to do it now. It strikes me as an unnecessary step to ask all the members of the Society to vote twice on a question when one vote will accomplish the same thing in the end.

Mr. BRUSH.—I call for action on my motion. (Question called for.)

The PRESIDENT.—The motion of Mr. Brush is to the effect that the following resolution be sent to letter-ballot.

Resolved, That the Committee appointed to report to the Society a set of Standard Rail Sections of weights beginning at 40 pounds and advancing by increments of 5 pounds to 100 pounds per lineal yard, is hereby discharged with the thanks of the Society.

(Vote put ; resolution carried.)

Mr. WHINERY.—I think every one here to-day has appreciated the value of this addition to the Society House, and I think they appreciate the good taste and judgment shown ; we are primarily indebted for this work to the Board of Direction of the Society, but I understand that a committee of three have had the work especially in charge. I move a vote of thanks be tendered to the Board and to that Committee of three. (Seconded.)

The PRESIDENT.—It is moved and seconded that a vote of thanks be tendered to the Committee who superintended the erection of the extension of the Society House. (Carried.)

The SECRETARY.—Mr. President, Mr. Hering, who has recently been compelled to go down town, requests me for him to offer the following resolution :

Resolved, That a Committee of five be appointed to report a uniform system of nomenclature of structures and parts of structures used in systems of sewerage in America.

(The motion was seconded.)

The PRESIDENT.—That I understand will go to the Board of Direction to prepare a letter-ballot, with arguments for and against, and go to the Society. (Vote put ; carried.)

Recess was then taken till 20 o'clock.

EVENING SESSION.

Twenty o'clock. Mr. Charles Macdonald described details of the construction of the foundation of the Hawksbury Bridge in Australia.

After this meeting a reception was held.

The meetings and reception occurred in the new and commodious extension to the Society house.

On Thursday, January 16th, the Members went by boat to Willet's Point, New York Harbor, where, by the courtesy of Lieutenant-Colonel William R. King, Corps of Engineers U. S. A., Major R. L. Hoxie, M. Am. Soc. C. E., Corps of Engineers U. S. A., and other officers, the Government Works and Museum were inspected. The visitors also witnessed the explosion of marine torpedoes, by one of which a vessel was blown up within a short distance of the dock.

The party then proceeded to the Navy Yard, where, under the escort of Civil Engineer P. C. Asserson, U. S. Navy, M. Am. Soc. C. E., and other officers, the new frigate Maine, now under construction, the new dry docks and other matters of interest, were inspected.

In the evening a reception was enjoyed, tendered at its Club House by the Engineers' Club.

The members of the Society, of the various classes, 192 in number, present at the Annual Meeting, excursion, etc., were: Charles Ackenheil, P. C. Asserson, John W. Bacon, Frederick H. Baldwin, Charles J. Bates, Arthur Beardsley, Max J. Becker, John A. Bensel, Frederick S. Benson, Louis De Coppet Berg, R. M. Berrian, George H. Bishop, H. Bissell, John Bogart, Alfred P. Boller, Channing M. Bolton, Daniel Bontecou, William F. Booth, W. A. Brackenridge, Henry R. Bradbury, P. F. Brendlinger, Jules Breuchaud, Josiah A. Briggs, H. Waller Brinckerhoff, Frederick Brooks, Thomas E. Brown, Jr., Charles B. Brush, Andrew Bryson, William D. Bullock, James A. Burden, Robert Cartwright, L. Russell Clapp, Frank H. Clement, Edward B. Codwise, Francis Collingwood, Alfred G. Compton, S. L. Cooper, J. N. Hayward Cornell, Alfred Craven, J. James R. Croes, Joseph P. Davis, E. P. Dawley, George Devin, S. L. F. Deyo, P. P. Dickinson, Stancliff B. Downes, Thomas Egleston, Charles E. Emery, Louis P. Evans, Herbert C. Felton, F. N. Finney, Clark Fisher, J. Foster Flagg, Sandford Fleming, A. D. Foote, John D. Fouquet, James B. Francis, John R. Freeman, Arthur J. Frith, George H. Frost, A. Fteley, Charles E. Goad, A. Gottlieb, Charles S. Gowen, Samuel M. Gray, William Gray, E. A. Greene, F. V. Greene, George S. Greene, George S. Greene, Jr., Stephen S. Haight, George E. Harding, George R. Hardy, Charles M. Harris, Robert L. Harris, S. A. Harrison, William J. Haskins, Charles H. Haswell, G. F. Haynes, W. W. Hegeman, Rudolph Hering, Albert B. Hill, S. Willett Hoag, Jr., John J. Hopper, E. W. Howe, George

W. Howell, R. L. Hoxie, Alfred E. Hunt, Robert W. Hunt, William R. Hutton, Charles E. Jackson, S. J. Johnson, George A. Just, Walter Katté, C. S. Kelsey, George A. Kimball, N. S. Latham, J. F. Le Baron, G. Leverich, James F. Lewis, Horace Loomis, Thomas J. Long, Thomas D. Lovett, Gorham P. Low, Julius I. Livingston, A. W. Locke, Charles Macdonald, William W. Maclay, Edward E. Magovern, David E. McComb, T. H. McKenzie, G. W. McNulty, Mansfield Merriman, O. E. Michaelis, T. Spencer Miller, James E. Mills, George S. Morison, Gouverneur Morris, Charles H. Myers, Charles H. Nash, Charles E. Newham, Edward P. North, F. O. Norton, Albert F. Noyes, Ellis B. Noyes, James Owen, A. McC. Parker, W. Barclay Parsons, George W. Parsons, John N. Pott, Alexander Potter, William A. Pratt, Henry G. Prout, George S. Rice, Robert Ridgway, E. P. Roberts, Percival Roberts, Jr., William Roberts, Charles L. Rowland, Thomas F. Rowland, Jr., J. Gardner Sanderson, William L. Saunders, Albert C. Savage, C. C. Schneider, Henry B. Seaman, Coleman Sellers, Ira A. Shaler, George S. Skilton, Frank W. Skinner, Albert M. Smith, Maxwell Smith, Miller A. Smith, Julio F. Sorzano, D. McN. Stauffer, F. P. Stearns, John M. Stewart, Charles F. Stowell, S. C. Thompson, George H. Thomson, John Thomson, George C. Tingley, Stevenson Towle, Henry R. Towne, E. E. Russell Tratman, L. L. Tribus, Alfred W. Trotter, Robert Van Buren, John G. Van Horne, Downing Vaux, Theodore Voorhees, Montgomery Waddell, W. W. Walker, Lebbeus B. Ward, James R. Wardlaw, R. Willard Ware, C. S. Warner, Frank S. Washburn, F. W. Watkins, Edward Wegmann, Jr., Frederick C. Weir, A. M. Wellington, Nelson J. Welton, E. B. Weston, Schuyler S. Wheeler, Samuel Whinery, Frank O. Whitney, Don J. Whittemore, W. F. Whittemore, William H. Wiley, C. J. H. Woodbury, William E. Worthen, Henry W. York.

REPORT OF THE BOARD OF DIRECTION FOR THE YEAR ENDING DECEMBER 31ST, 1889.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, JANUARY 15TH, 1890.

The Board of Direction, in compliance with the provisions of the Society law, presents its Report for the year ending December 31st, 1889.

MEMBERSHIP.

The following tables show the changes and additions during the year in the various classes of membership.

On January 1st, 1889, the date of the last report, the membership in the Society was :

Honorary Members, resident..	7	Non-resident....	3	Total..	10
Corresponding Members.....	—	"	3	" ..	3
Members, resident.....	193	"	751	"	944
Associates, "	12	"	36	"	48
Juniors, "	40	"	104	"	144
	—		—		—1 136
Making, resident.....	252	Non-resident....	897		—
Total.....					1 149

Fellows, 59, of whom 5 Members are included above, leaving..... 54

Subscribers to the Building Fund, 140, of whom 87 are entered in one or other of the above classes, and 13 deceased, leaving.... 40

Total connected with the Society, January 1st, 1889.....1 243

At the present date, January 1st, 1890, the membership is :

Honorary Members, resident..	5	Non-resident...	3	Total....	8
Corresponding Members.....	—	" ...	3	"	3
Members, resident.....	180	" ...	830	"	1 010
Associates, "	16	" ...	39	"	55
Juniors, "	39	" ...	130	"	169
	—		—		—1 234
Making, resident.....	240	Non-resident .	1 005		—
Total.....					1 245

Fellows, 56, of whom 5 Members are included above, leaving..... 51

Subscribers to the Building Fund, 140, of whom 85 are entered in one or other of the above classes, and 16 deceased, leaving.... 39

Total connected with the Society, January 1st, 1890.....1 335

The additions during the past year to the several classes of Society membership have been :

Members qualified	84
Associates qualified	11
Juniors qualified	32
Fellow qualified	1
Total additions	128

The decrease during the year in the several classes of membership has been :

Honorary Members	Died 2				2
Members	" 13	Resigned 5			18
Associates	" 1	" 3			4
Juniors	" —	" 1	Transferred to Member, 6		7
Fellows	" 4				4
Subscriber	" 1				1
Totals: Deaths, 21; Resignations, 9; Transferred, 6					36

There has been an addition of 128 to the various classes of membership, and a decrease of 36, making the actual net additions during the year 92 in number.

On January 1st, 1889, there were, as stated in the last Annual Report, 26 proposals pending. One hundred and eighty-seven proposals have been received during the year; 84 candidates have been elected Members, of whom 6 were transferred from Juniors; 10 candidates have been elected as Associates; 35 candidates have been elected as Juniors; 1 candidate has been elected a Fellow.

Eighty-four persons have during the year qualified as Members; 11 have qualified as Associates; 32 have qualified as Juniors; 1 has qualified as Fellow; 9 candidates elected during the year as Members and five as Juniors have not yet qualified. There are 54 proposals now pending.

The Library has been increased during the year by the following additions:

Books and pamphlets	468
Maps, plans, drawings, charts, photographs and engravings	221

The Society has lost, by death, during the term covered by this report, two Honorary Members: HORATIO ALLEN and JOHN ERICSSON; thirteen Members: ADNA ANDERSON, WILLIAM S. BARBOUR, HENRY A. BENTLEY, HENRY D. BLUNDEN, HENRY S. CRAVEN, NATHANIEL W. ELLIS, LOUIS LESAGE, CHARLES A. MARSHALL, JAMES H. MORLEY, EDWARD S.

PHILBRICK, ALBERT B. ROGERS, CHARLES C. SMITH and WILLARD H. WIGHTMAN; one Associate: EDWARD BAUMANN; and four Fellows: EDWARD P. ALLIS, SAMUEL M. FELTON, WILLIAM M. LYON and WILLIAM SHAW.

MEETINGS OF THE SOCIETY.

Twenty-one meetings of the Society were held during the year, one of which was the Annual Meeting, held in New York, January 16th and 17th; and another, the Annual Convention, held at Seabright, N. J., June 20th to 26th. All the sessions of the Convention, including the business meeting, being counted as one meeting of the Society.

On February 20th a joint meeting of the Society and the American Institute of Mining Engineers was held, at which occurred a discussion on Iron and Steel.

Twelve meetings of the Board of Direction have been held during the year.

Collations provided by subscriptions of Resident Members have followed the regular meetings of the Society at New York.

ANNUAL CONVENTION.

The Annual Convention was held at Seabright, N. J., June 20th to 26th, 1889. There were 134 members in attendance, a large number of ladies, and several visiting foreign engineers. The President of the Society delivered the Annual Address. A number of interesting technical and professional papers were read and discussed, and at the business meeting the reports of the Special Committees on the Proper Relation to each other of the Sections of Railway Wheels and Rails, and on Uniform Standard Time, were presented, and the subjects considered.

Propositions for the appointment of other committees were discussed, and afterwards submitted to letter-ballot of the whole membership, resulting in the passage of resolutions appointing a committee on Standard Sections of Railway Rails, on Impurities of Domestic Water Supply; on Uniform Methods of Testing Materials Used in Metallic Structures and on such Requirements for these Materials as may conduce to further improve the grade of such structures.

A resolution was also adopted for the appointment of a committee of seven members of the Society to consider and report upon a systematic revision of the Constitution and By-Laws. This Committee has since been appointed and is to make a report at the Annual Meeting.

The place chosen for the Convention was fortunate as possessing an excellent hotel of ample capacity to accommodate all those attending the Convention. The large number of members of the Society who desire to meet their fellow members at the conventions limits the choice

of a place for the Convention to the localities possessing this, as well as other desirable requirements.

The suggestions made by members of the Society as to a place for the next Convention will be presented for your consideration at this meeting.

The Society House.

The present Annual Meeting will be the occasion of the use for the first time of the extension to the Society House. The building of this extension was determined upon after very careful consideration by the Board of Direction, to which Board the decision as to the best present expenditure of a portion of the Society building fund had been referred by the Society. It is not intended that this extension should be considered as a culmination of the movement inaugurated some time ago for securing a suitable permanent home for the Society work, but it is believed that it will accommodate the uses of the Society for a few years, during which the effort to secure the means to build a house fitted for the Library and meetings, and the work of the Society may be continued. This extension has been erected at a moderate cost, and it is believed by persons familiar with the value of real estate in the City of New York that, when the time comes for disposing of the present Society house, the extension will add to the value of the house full as much as it has cost the Society. The Board congratulates the Society upon the greatly increased accommodation which has been provided, both for the meetings of the Society and for its other work.

The Norman Medal.

The Norman Medal for the year 1888 was awarded to Paper No. 388, "English Railroad Track," by E. E. Russell Tratman, Jun. Am. Soc. C. E.

The Board of Censors to award this medal for the past year will present its report at the present meeting.

The Rowland Prize.

The Rowland Prize for the year 1888 was awarded to Paper No. 371, "The Venturi Water Meter," an instrument making use of a new method of gauging water, applicable to the cases of very large tubes, and of small value only of the liquid to be gauged, by Clemens Herschel, M. Am. Soc. S. E.

The committee to award this prize for the past year will present its report at the present meeting.

Amendments to the Constitution.

The Committee appointed under a resolution adopted at the Annual Convention to consider a revision of the Constitution and By-Laws, presented a report of progress at the meeting of the Society held

November 6th, 1889. In this report the Committee states that the time at its disposal and the magnitude of the various questions involved would not permit a final report of an amended constitution to be made in time for submission at the present Annual Meeting. The Committee, however, submitted a Codification of the present Constitution and By-Laws, prepared by grouping together all the present articles relating to one subject in one article, but not changing at all the sense or meaning of the present Constitution and By-Laws. This Codification is submitted for discussion at the present meeting and for submission to the vote of the Society after discussion.

The Committee also submitted at the same time an amendment to the amending clause of the present Constitution, which simply provides that amendments may be considered, discussed and amended at the business meeting at the Annual Convention and voted upon thereafter, in the same manner as they may now be considered at the Annual Meeting.

The report of the Committee, the Codification of the present Constitution and the proposed amendment, as to the manner of amending, will be presented and discussed at this meeting.

The Report of the Special Committee on Uniform Standand Time.

This Committee presented at the last Annual Meeting and at the Convention a report of progress. At the Convention the Board of Direction was authorized and requested to send out copies of the last report of this Committee, which has been done with the result of securing considerable additional material, which is to be presented at this meeting in the report of this Committee.

Report of the Committee to Consider the Proper Relation to Each Other of the Sections of Railway Wheels and Rails.

The Committee presented a report of progress at the Annual Meeting and a final report at the Convention, which was accepted and the Committee discharged. This report, with extended discussion upon the subject, has been printed in the Transactions of the Society.

Committee on the Failure of the Dam at South Forks, Pa.

This Committee presented a very interesting verbal report at the last Convention, showing the progress they had made in their investigation.

It is expected that a more complete report will be presented at the Annual Meeting.

Visit of Members of the Society to Europe.

A number of members of the Society visited Europe during the past summer. Their reception by the engineers of England, France and

Germany was of the most hospitable and cordial character. The Board of Direction, in behalf of the Society, takes pleasure in putting upon permanent record in this report an expression of the appreciation by American engineers of the fraternal professional feeling thus exhibited by our foreign brothers.

The Transactions of the Society.

The Transactions of the Society have been issued during the year in two volumes, as has been the case for several years past.

The Board desires to renew the invitation for the contribution of professional papers and communications on subjects of engineering interest from all persons, whether members of this Society or not.

Early in the year there was issued to all members of the Society a new binding case for the Transactions, which it is understood has proved to be of the greatest convenience.

During the past year a most valuable addition has been made to the literature of the Society. An index to the Transactions from their beginning to the present time has been completed by the Secretary and will be directly issued.

The work is thorough and exhaustive. While it has required a considerable outlay of time and money, it has been felt for some time to be an actual necessity. First proof copies of the index may now be seen in the Library.

The work of Committees has largely increased during the past year. This also involved considerable outlay in printing and postage.

For the Board of Direction,

JOHN BOGART,

Secretary.

REPORT OF THE TREASURER FOR THE YEAR ENDING DECEMBER 31st, 1889.

Presented and Accepted at the Annual Meeting, January 15th, 1890.

RECEIPTS.

Balance on hand December 31st, 1888:			
Building Fund		$1 919 50	
General Funds		4 595 52	
			$6 515 02
Entrance Fees		$3 230 00	
Current Dues:			
From 125 Resident Members	$3 080 00		
" 615 Non-resident Members	9 005 00		
" 9 Resident Associates	120 00		
" 29 Non-resident Associates	290 00		
" 19 Resident Juniors	262 50		
" 100 Non-resident Juniors	970 00		
	$13 727 50		
Past Dues:			
From 10 Resident Members	$312 50		
" 61 Non-resident Members	1 038 00		
" 2 " Associates	15 00		
" 1 Resident Junior	5 00		
" 4 Non-resident Juniors	40 00		
	1 410 50		
Dues for year beginning January, 1890:			
From 45 Resident Members	$1 125 00		
" 203 Non-resident Members	3 045 00		
" 4 Resident Associates	60 00		
" 10 Non-resident Associates	100 00		
" 9 Resident Juniors	135 00		
" 34 Non-resident Juniors	355 00		
	4 820 00		
		19 958 00	
From sales of Publications	.....	1 203 91	
" Certificates of Membership	.....	143 00	
" Advertisements	.....	1 154 25	
" Interest on Pennsylvania Gen. Mort. Bonds	$660 00		
" " Savings Bank Deposit	19 59		
" " City New York Croton Aqueduct Stock	70 00		
" " Chicago & Northwestern Railroad Bond	50 00		
" " West Shore (N. Y. C. Guarantee) Bonds	200 00		
" " Consolidated Gas Stock	50 00		
" " Union Trust Company Deposit	19 89		
		1 069 48	
From Fellowship Fees	.....	150 00	
" Subscription to Library Funds	.....	50 00	
			26 958 64
From Seamen's Bank for Savings		$1 015 00	
" Sale of 5 West Shore Bonds (Fund for Enlarged Building)		5 311 25	
			6 326 25
			$39 799 91

DISBURSEMENTS.

Interest on Mortgage	$800 00	
Taxes	425 75	
Publications	12 734 64	
Stationery and Printing	1 297 51	
Postage	1 902 23	
Library	957 18	
Salaries	3 000 00	
Convention and Annual Meeting	1 093 23	
Janitor, House Supplies, Fuel Water and Gas	1 279 47	
Certificates of Membership	96 50	
Insurance	54 62	
Norman Medal and Rowland Prize	120 60	
Finance—Treasurer's Books, Accounts, Collections	1 200 00	
Work of Committees	876 57	
Other Expenditures	433 16	
		$26 271 46
Partial Payment for Enlargement of Society House		2 604 00
Balance on hand in Trust Company and Bank;		
Fund for Enlarged Building	$3 845 50	
Fellowship Fund	526 46	
General Funds	6 552 49	
		10 924 45
		$39 799 91

The Funds of the Society are as follows:

Fellowship Fund:	
Ninety-three subscriptions to December 31, 1888.....	$10 100 00
Premium and accumulated interest, December 31, 1888	1 388 28
Fund on hand, December 31, 1888.....	$11 488 28
One subscription during 1889.....	150 00
Interest received during 1889.....	540 00
	$12 178 28
Expended for Publications during 1889.....	540 00
	$11 638 28
The present investment of the Fund is:	
Nine Pennsylvania Railroad General Mortgage Bonds, cost.....	$11 111 82
Deposit in Union Trust Company.....	526 46
	$11 638 28
Norman Medal Fund:	
One certificate Croton Aqueduct stock, New York City	$1 000 00
Building Fund:	
Receipts previous to December 31, 1885.....	$17 842 00
Expended:	
For Payment on Purchase of Property.....	$14 000 00
For Improvement on Property.....	3 486 97
For Legal services, Circulars, etc.....	355 03
	$17 842 00
Fund for Enlarged Building:	
Receipts.....	$8 029 50
Expended on Enlargement.....	2 604 00
	$5 425 50
This Fund comprises:	
One Chicago and Northwestern 5 per cent. Bond, cost	$1 035 00
Part of ten shares Consolidated Gas Company of New York, cost.....	545 00
Cash.....	3 845 50
	$5 425 50

Rowland Prize Fund:

One Pennsylvania Railroad General Mortgage Bond, 6 per cent. cost	$1 222 50

Compounding Fund.

Six single payments for compounding dues	$1 650 00

The present investment of this Fund is:

One Pennsylvania Railroad General Mortgage 6 per cent. Bond, cost	$1 222 50
Part of ten shares Consolidated Gas Company of New York, cost	427 50
	$1 650 00

Respectfully submitted,

G. S. GREENE, JR.,
Treasurer.

REPORT OF THE FINANCE COMMITTEE.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, JANUARY 15TH, 1890.

The Finance Committee have the honor to report that they have performed the duty of auditing all the bills which have been paid by the Treasurer during the past year, and have found that each bill has been charged to its proper fund, and that the several sums paid have not exceeded the amounts appropriated by the Board of Direction for the purposes specifically mentioned.

They have also seen that the investments, transfers and deposits have been made, as detailed in the reports of the Secretary and Teasurer.

CHARLES B. BRUSH,
Chairman of Committee.

REPORT OF THE SPECIAL COMMITTEE ON UNIFORM STANDARD TIME.

PRESENTED AND ACCEPTED AT THE ANNUAL MEETING, NEW YORK, JANUARY 15TH, 1890.

The Special Committee on Uniform Standard Time beg leave to report:

At the last Annual Meeting the Society passed two resolutions. One directing that further efforts be made to effect the general adoption of the 24-hour notation by the railways of the country. Another requesting the Committee to take such steps as may be approved by the Board of Direction of the Society to bring the subject of time reform to the attention of the public schools.

The Committee has endeavored to carry out both resolutions; the members have not, however, succeeded in meeting the views of the Society with regard to the second resolution. They have had a good deal of correspondence on the subject, but so far have been unable to satisfy themselves as to the best form and manner of carrying out the resolution.

With respect to the first resolution, the Committee is enabled to report absolute and substantial progress, the last annual report of the Committee, together with other documents bearing on the question having been published in pamphlet form, and widely circulated. Railway managers and others were asked to state their views as to the adoption of the new notation by the railways of the country.

The Committee have to announce the receipt of 237 replies to the circular issued; of these 17 are unfavorable and 220 favorable to the adoption of the proposed change.

Persons answering the circular were requested to indicate the year when, in their opinion, the change might be effected, allowing sufficient time for such preparation as might be deemed necessary.

In the 220 favorable replies received:

27	named the year	1892
68	" "	1891
95	" "	1890

30 gave no date.

Thus it appears that none of these replies give a later date than 1892; nearly half the whole number named the present year, and, if we assume, what is highly probable, that the 30 persons who mention no date would concur in the views of the majority, no less than 84 per cent. of the whole number think the change might be effected not later than the year 1891, should a general assent be first expressed.

The last annual report was copied in the following technical journals with favorable endorsements, and probably into other publications which the members of the Committee did not see:

The Travelers' Official Guide.
The Railway Conductors' Monthly.
The Railroad Gazeteer, of San Francisco.
Journal of the Brotherhood of Locomotive Engineers.
The Railroad Gazette, of New York City.
The Railway Age, of Chicago.
Engineering News, of New York City.
The Railroad Record, of Philadelphia.

It has not come to the knowledge of the Committee that any journal has at any time expressed any opposition to the new notation.

The Committee has considered it advisable to tabulate the replies recently obtained with those received in previous years. It thus appears that between five and six hundred prominent men in every section of the country have responded to the Society's interrogations, and of these an exceedingly small percentage have given expression to an opinion adverse to the early adoption of the new notation.

As it is especially important to ascertain the opinions of leading railway men on this question, the Committee has caused a classification to be made of the Presidents, Managers, Superintendents and others, who have favorably responded to the Society's communications.

The list so prepared accompanies this report. It embraces the following railway authorities who are in favor of the simultaneous adoption of the 24-hour notation on the railways in the country so soon as it is ascertained that a considerable majority will give their assent.

Presidents and Vice-Presidents	30
Vice-Presidents and Managers	13
General Managers and Assistant General Managers	80
General Superintendents	73
Superintendents	110
Chief Engineers and Assistants	63
Managers of Transportation and General Traffic	10
Receivers	5
Total	384

The aggregate length of railways with which these officers are connected amounts to fully 135 000 miles, and although all of the officers on each line have not yet expressed an opinion, the Committee are inclined to believe that when heard from the greater number of them will express the same views on this question.

While the Committee ventures to congratulate the Society on the highly satisfactory results of the inquiries so far made, they are of opinion that as the matter concerns so many people it will be best to proceed with wise deliberations; they, therefore, beg leave to suggest that the

ascertained facts be communicated to the journals above mentioned, and that further efforts be made to secure an expression of the greatest possible unanimity, especially among railway men.

General unanimity satisfactorily established among those who control the railways of the country, it will then be fit and proper for them to take decisive action. It is obvious that the change should be effected simultaneously six or twelve months after an agreed date, and the proper authority to determine the date is the General Time Convention.

The Committee cannot doubt that when the change to the new notation comes to be satisfactorily established the entire railway system and the community generally will recognize that a public boon has been conferred not less valuable than that already conferred by the adoption of standard time.

The Committee has the satisfaction to report that the hour zone system is now approved by the railway administration in Austro-Hungary, soon to be followed, it is believed, in Germany, Italy and Switzerland. The reckoning of time in Great Britain and Sweden is already in harmony with the hour zone system. The 24-hour notation has been adopted for railway service in China.

The Committee deem it proper to bring to the notice of the Society that the Government of the United States has so far taken no action on the resolutions and recommendations of the Washington International Conference of 1884. As the reforms in time-reckoning so largely adopted and proposed to be adopted in this country are in harmony with the resolutions of the conference, and as questions are constantly arising as to the legal aspect of standard time, it would be in the public interest to have the recommendations of the conference authoritatively recognized, and also perhaps some satisfactory statutory enactment legalizing the changes made and contemplated in respect to the reckoning of time.

The Committee respectfully suggest that the Society should memorialize the United States Government on this subject.

SANDFORD FLEMING,
CHARLES PAINE,
THEODORE N. ELY,
J. M. TOUCEY,
T. EGLESTON,
FRED. BROOKS,
Committee.

FORM OF MEMORIAL PROPOSED BY THE COMMITTEE ON UNIFORM STANDARD TIME.

ORDERED AT ANNUAL MEETING, JANUARY 15TH, 1890, TO BE SUBMITTED TO LETTER-BALLOT.

The Memorial of the AMERICAN SOCIETY OF CIVIL ENGINEERS in Annual Meeting assembled,

Respectfully showeth:

1. That the application of science in facilitating intercourse between places separated by great distances has developed imperfections of time-reckoning not previously experienced; moreover, it has been found that the difficulties increase with the increase of population and the multiplication of lines of rapid communication.

2. That efforts have been made during the past ten years to obviate the difficulties which have sprung up by establishing a modified system of time-reckoning based on principles generally acceptable.

3. That the President of the United States, on the authority of Congress, invited the governments of all civilized nations to take part in the solution of the problem, by appointing delegates to meet in general Conference to consider the matter.

4. That delegates representing twenty-five nations met in Conference at Washington in 1884, and that after patient deliberation and prolonged discussion, they with substantial unanimity passed a series of resolutions recommending the leading principles by which the desired objects could be best attained.

5. That the International Conference recommended a common zero and a common unit measure of time, the universal day, which any community may spontaneously adopt as the standard for daily reckoning. That the Conference recommended the division of the universal day into twenty-four hours, to be reckoned in a single series of numbers from 0 to 24 in consecutive order.

6. That by the system now in general use throughout the United States and Canada the hours, though differently numbered, are simultaneous with the hours of the universal day, and that it is now in contemplation in many quarters to adopt the 24-hour notation for railway reckoning as recommended by the Conference for the universal day.

7. That so far the Government of the United States has taken no action on the recommendations and resolutions of the International Conference, and legal authority has not been extended to the reform in time-reckoning, to a large extent adopted throughout North America.

Wherefore, the American Society of Civil Engineers, in Annual Meeting assembled, respectfully represents to the Government of the United States, as follows, viz.:

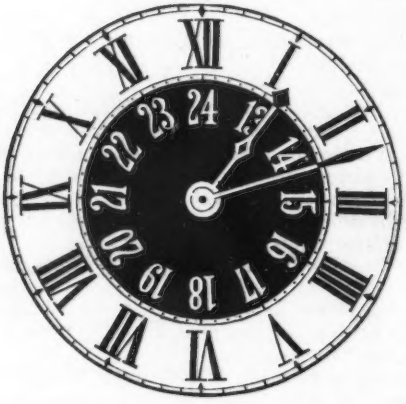
First.—That, in the opinion of this Society, it would be in the general interests of the United States to formally accept the resolutions of the International Conference held at Washington in 1884.

Second.—That, in the opinion of this Society, it would be in the general interests to legalize by Act of Congress the now common system of regulating time by hour meridians.

Third.—That, in the opinion of this Society, it would be in the general interests to embrace in an Act of Congress a permissive clause authorizing and legalizing the use of the 24-hour notation.

On behalf of the Society.

RAILWAY MANAGERS IN FAVOR OF THE NEW NOTATION OF TIME.



The following is a list of railway men who have sent replies favoring the adoption of the 24-hour notation as soon as a considerable majority of railway authorities assent:

THE LIST COMPRISES:

Presidents and Vice-Presidents	30
Vice-Presidents and Managers	13
General Managers and Assistant General Managers	80
General Superintendents	73
Superintendents	110
Chief Engineers and Assistants	63
Managers of Transportation and General Traffic	10
Receivers	5
Total	384

A large number of prominent persons not connected with railways have also sent replies in favor of the new time notation. Only an exceedingly small percentage of all heard from in every quarter have expressed an opinion unfavorable to the change.

It has been suggested that the change should be effected simultaneously on all railways twelve months after an agreed date, which date may be chosen by the General Time Convention.

NOTE.—The years given in the last column indicate the time suggested for effecting the change, in some of the replies received in 1889. The letter A in last column refers to list published in August, 1889; the letter B to list published in January, 1887; the letter C to list published in 1884.

Adirondack	C. E. Durkee	Supt	B
Alabama Midland	C. M. Craig	Asst. Engr	1891
Alleghany Valley	David McCargo	Gen. Supt.	B
Arkansas Valley	H. Wood	Gen. Supt.	A
Atchison, Topeka & Santa Fé	A. A. Robinson	Gen. Man	B
Atchison, Topeka & Santa Fé	D. I. Chase	Gen. Man	A
Atchison, Topeka & Santa Fé	Avery Turner	Supt	1891
Atchison, Topeka & Santa Fé	H. V. Hinckley	Off. Engr	1890
Atlantic Coast Line, Rich. Div.	H. Walters	Gen. Supt	A
Atlantic Coast Line, Char. Div.	John F. Divine	Gen. Supt	A
Atlantic & N. Carolina	W. Dunn	Supt	B
Atlantic & Pacific	S. W. Robinson	Eng. Bri	—
Baltimore & Ohio	S. Spencer	V. Pres	C
Baltimore & Ohio	G. B. Hazlehurst	Eng. Brdgs	1891
Baltimore & Ohio	James G. Dagron	Supt. Brdgs	1892
Beech Creek	A. G. Palmer	Supt.	1891
Belaire, Zanesville & Cincinnati	W. R. Compton	Gen. Man.	B
Bennington & Rutland	F. C. White	Gen. Supt	B
Boston, Hoosac Tunnel & West	C. A. Coombs	Gen Man	A
Boston, Hoosac Tunnel & West	Chas. H. Covy	Supt	B
Boston, Barre & Gardner	H. H. Marshall	Supt. & Tr. Man	B
Boston & Lowell	C. S. Metten	Gen. Supt	B
Boston & Providence	Albert A. Folsom	Supt	B
Boston, R. Beach & Lynn	C. A. Hammond	Supt	B
Brazos & Northern	G. Y. Wisner	2nd V. Pres	1890
Brooklyn, Bath & C. I	Geo. A. Gunther	Gen. Man	B
Brooklyn, Bath & West End	John P. Heindell	Gen. Supt	1892
Brunswick & Western	H. S. Morse	Gen. Man	B
Buffalo & Geneva	Paul S. King	Ch. Eng	1892
Buffalo, N. Y. & Phil	Geo. S. Gatchell	Gen. Supt	B
Buffalo, N. Y. & Phil	J. W. Watson	Supt	B
Buffalo, Rochester & Pittsburgh	G. W. Bartlett	Gen. Supt	1890
Burlington, Cedar Rapids & N.	Robert Williams	V. P. & Supt	A
Burlington, Cedar Rapids & W.	C. J. Ives	Gen. Supt	A
California Southern Ry	J. N. Victor	Supt	B
Canadian Government	C. Schreiber	Gen. Man	1890
Canadian Government	D. Pottinger	Chief Supt	1890
Canadian Government	P. S. Archibald	Chief Eng	1890
Canadian Government	J. E. Price	Supt	1890
Canadian Government	J. J. Wallace	Supt	1890
Canadian Government	A. R. Macdonald	Supt	1890
Canadian Pacific	W. C. Van Horne	President	1890
Canadian Pacific	T. G. Shaughnessy	Asst. Pres	1890
Canadian Pacific	George Olds	Gen. Tr. Man	1890
Canadian Pacific	Henry Beaty	Man. S. L.	1890
Canadian Pacific	T. A. Mackinnon	G. Sup. O & A. Div.	1890
Canadian Pacific	C. W. Spencer	Gen. Supt. E. Div.	1890
Canadian Pacific	Wm. Whyte	Gen. Supt. W. Div.	1890
Canadian Pacific	Harry Abbott	Gen. Supt. P. Div.	1890
Canadian Pacific	W. T. Jennings	Eng. & Man. Cons.	1890
Cape Fear & Yadkin Valley	J. S. Morrison	Gen. Supt	B
Cape Fear & Yadkin Valley	J. W. Fry	Gen. Supt	A
Catasauqua & Fogelsville	C. W. Chapman	Supt. & Eng	1891
Central of Georgia	M. S. Belknap	Gen. Man	A

Central of Georgia	Wm. Rogers	Gen. Supt	B
Central of Georgia	C. E. Marrin	R. Master	1892
Central Iowa Ry	D. P. Phelps	Asst. Supt	B
Central N. England & Western	S. B. Opdyke, Jr.	Gen. Supt	1890
Central N. England & Western	Geo. N. Merrill	Res. Eng	1890
Central Pacific	J. H. White	Supt	B
Central Vermont	J. W. Hobart	Gen. Man	B
Central Vermont	C. A. Converse	Asst. Supt	B
Central of New Jersey	J. H. Olhauson	Gen. Supt	—
Charleston, Cin. & Chicago	John F. Jones	Supt. & Tr. Man	—
Charleston & Savannah	C. S. Gadsden	Gen. Supt	1891
Chattoroi Ry	F. H. Oliphant	Gen Man	B
Chesapeake & Ohio	J. T. Harahan	Gen. Man	1891
Chesapeake & Ohio	H. D. Whitcomb	Con. Eng	1890
Chesapeake & Ohio	T. C. Eggleston	Eng. M. W	1891
Chesapeake, Ohio & S. W	J. L. Frazier	Supt	B
Chicago, Burlington & Northern	Geo. B. Harris	Gen. Man	A
Chicago, Burlington & Quincy	J. Potter	V. Pres	C
Chicago, Burlington & Quincy	F. Lawler	Div. Eng	1891
Chicago, Fair. & Eau Claire	G. A. Foster	Asst. Gen. Man	B
Chicago & East Illinois	O. S. Lyford	V. P. & Gen. Man	1892
Chicago & N. Michigan	J. H. V. Agnew	Gen. Supt	1892
Chicago & N. Western	C. Palmer	Supt. Bridges	1891
Chicago, Santa Fé & Cal	E. G. Nourse	Asst. Eng	1892
Chicago, M. & St. Paul	L. B. Rock	Supt	B
Chicago, M. & St. Paul	Onward Bates	Supt. Bridges	1891
Chicago, M. & St. Paul, W. Div.	J. H. Lakey	Supt	B
Chicago & Atlantic	J. H. Parsons	Supt	A
Chicago & Atlantic	Fred. Broughton	Gen. Man	A
Chicago & Grand Trunk	A. B. Atwater	Supt	1891
Chicago & Grand Trunk	W. H. Pettibone	Supt	B
Chicago & N. Western	J. Whitman	Gen. Man	—
Chicago, Rock Island & Pacific	W. I. Allen	Gen. Supt	1892
Chicago, Rock Island & Pacific	H. F. Royce	Gen. Supt	A
Chicago, Rock Island & Pacific	A. Kimball	V. Pres	B
Chicago, Rock Island & Pacific	R. H. Chamberlin	Supt	B
Chicago, St. Paul & Kansas	John M. Eagan	Gen. Man	1891
Chicago & West Indiana	B. Thomas	V. P. & Gen. Man	1890
Chippewa Val. Ch. & W. Mich	A. M. Nichols	Gen. Supt	B
Cincinnati, Ham. & Dayton	C. C. Waite	V. Pres	B
Cincinnati, Jackson & Wash	R. W. Buckmaster	Sup. Trans	A
Cincinnati & Musk. Valley	F. G. Darlington	Supt	1890
Cincinnati & Musk. Valley	W. C. Cushing	Eng. M. W	1890
Cincinnati, N. O. & Texas	W. C. Jewett	Res. Eng	1892
Cincinnati, N. O. & Texas	R. Carroll	Gen. Supt	B
Cincinnati, N. O. & Texas	G. B. Nicholson	Ch. Eng	1891
Cincinnati, N. O. & Texas	Ward Baldwin	Asst. Eng	1891
Cincinnati Union Depot	R. L. Read	Eng	—
Cincinnati, Van W. & Mich	E. Garrison	Gen. Man	B
Cincinnati, Washington & Balt	J. H. Stewart	Gen. Man	A
Cleveland, Ak. & Columbus	N. Monsarratt	Pres. & Gen. Man	A
Cleveland, Cin. Ch. & St. L	E. A. Hermann	Asst. Eng	—
Cleveland & Canton	J. W. Wardwell	Supt	1891
Cleveland & Canton	H. A. Kennedy	Asst. Supt	1890
Cleveland, Col. Cin. & Ind	J. D. Layng	Pres	A
Cleveland, Col. Cin. & Ind	G. M. Mead	Gen. Man	A
Colorado Midland	H. Collbran	Asst. Gen. Man	1891
Columbus, Hocking Val. & T	G. R. Carr	Gen. Supt	B
Columbus & Western	E. A. Flewellan	Gen. Man	B
Conotton Valley	Samuel Briggs	Gen. Man	B
Coudersport & Port Allegh	B. A. McClure	Gen. Supt	B

Delaware & Hudson	H. G. Young	Gen. Man	A
Delaware & Hudson	C. D. Hammond	Supt	1891
Delaware & Hudson	J. W. Burdick	Gen. Pas. Agt	A
Delaware & Hudson	A. J. Swift	Chief Eng	1890
Delaware, Lack. & Western	Chas. C. Rose	Div. Eng	1890
Delaware, Lack. & Western	W. B. Phelps	Supt	B
Denver & Rio Grande	S. T. Smith	Gen. Man	1890
Denver & Rio Grande	C. Lydon	Supt	B
Denver & Rio Grande	R. E. Briggs	Ch. Eng	1890
Denver, Utah & Pacific	L. M. Fouts	Supt	A
Denver, Texas & Fort Worth	F. E. Bissell	Supt. & C. E	1890
Detroit, Mack. & Marquette	D. McCool	Gen Supt	B
Detroit, Lansing & Northern	F. M. Drake	Asst. Supt	1892
Detroit, Lansing & Northern	Job Tuthill	Ch. Ass. Eng	1892
Detroit, Lansing & Northern	J. J. McLean	Chief Eng	1892
Dunkirk, All. Val. & Pittsburgh	Chas. A. Chute	Asst. Supt	1891
Dunkirk, All. Val. & Pittsburgh	D. Thayer	Gen. Supt	A
East Tenn., Virginia & Georgia	C. H. Hudson	Gen. Man	A
East Tenn., Virginia & Georgia	J. W. Fry	Supt	B
East Tenn., Virginia & Georgia	H. Fink	V. Pres. & G. Man	B
East & West of Alabama	John Postell	Gen. Man	B
Eureka & Palisade	B. Gilman	Gen. Supt	B
Eureka Springs	Powell Clayton	V. Pres. & G. Man	B
Evansville & Terre Haute	T. A. Allen	Ch. Eng	1891
Fairhaven Southern	J. J. Donovan	Ch. Eng	1891
Fall Brook Coal Co	G. R. Brown	Gen. Supt	1892
Fall Brook Coal Co	W. A. Foster	Supt	1890
Fitchburg	H. A. Phillips	Supt	1890
Flint & Pere Marquette	Sanford Keeler	Supt	1891
Flint & Pere Marquette	D. Edwards	Asst. Gen. Man	B
Flint & Pere Marquette	W. F. Potter	Supt	B
Flint & Pere Marquette	Geo. M. Brown	R. Master	B
Florida Ry. & N. Co	J. J. Phillips	Asst. Gen. Man	A
Fort Wayne, Cincin. & L	H. W. Worthington	Gen. Supt	A
Fort Worth & Denver City	C. L. Frost	Supt	B
Fort Madison & N. Western	Chas. A. Gilchrist	Rec. & Supt	1891
Georgia	J. W. Green	Gen. Man	1891
Georgia	S. A. Hamphill	Supt	A
Georgia Pacific	T. G. Sage	Gen. Man	A
Georgia Pacific	J. W. Sage	Gen. Supt	B
Georgia Southern & Florida	J. Lane	Gen. Man	1891
Grand Trunk of Canada	Joseph Hickson	Gen. Man	—
Grand Trunk of Canada	Wm. Wainwright	Asst. Man	B
Grand Trunk of Canada	J. Stephenson	Supt	B
Grand Trunk of Canada	Samuel Barker	Man. N. Div	B
Grand Trunk of Canada	Charles Stiff	Supt	A
Galveston, Sabine & St. L	B. Barnes	V. Pres. & G. Man	B
Galveston, Harr. & San Antonio	W. G. Van Vleck	Supt	B
Grand Southern	F. W. Holt	Supt. & Eng	B
Green Bay, Winona & St. Paul	Timothy Case	Gen Supt	B
Gulf, W. Texas & Pacific	M. D. Monserate	Pres	B
Gulf, Colorado & Santa Fé	J. H. Scott	Gen. Supt	1890
Hartford & Connecticut Western	R. P. Martin	Supt	1890
Hartford & Connecticut Western	John F. Jones	Gen. Supt	B
Houston & Texas Central	G. A. Quinlan	Gen. Supt	1890
Houston & Texas Central	J. Waldo	V. Pres	B
Houston & Texas Central	Donald Allen	Eng. & Supt	B
Houston, E. & W. Texas	W. H. Wentworth	Asst. Gen. Man	B
Houston, E. & W. Texas	M. G. Howe	Receiver	1890
Illinois Central	E. T. Jeffrey	Gen. Supt	B
Illinois Central	C. M. Shaeffer	Supt	B

Indiana, Ill. & Iowa	T. P. Shouts	Gen. Supt	B
Indianapolis, Decatur & Western	L. A. Boyd	Supt	1890
Indianapolis, Decatur & Sp'gfield	G. W. Bender	Supt	A
Indianapolis & St. Louis	T. W. Burrows	Supt	A
International	D. E. McFee	Supt	B
Jacksonville, Tampa & K. W	C. O. Parker	Asst. Gen. Man	1890
Jacksonville S. Eastern	E. S. Greenleaf	Supt	B
Jeffersonville, M. & Indianapolis	E. W. McKenna	Supt	B
Kanawha & Ohio	L. D. Button	Supt	1892
Kanawha & Ohio	Thos. R. Sharp	Gen. Man	A
Kansas City B. M.	W. B. Knight	Ch. Eng	—
Kansas City, F. Scott & Memphis	Geo. H. Nettleton	Pres & Gen. Man	A
Kansas City, F. Scott & Memphis	W. W. Fagan	Gen. Supt	—
Kansas City, C. S. & C. River	W. W. Fagan	Gen. Supt	—
Kansas City, St. Joseph & C. B	J. F. Barnard	Gen. Man	B
Lackawanna & Pittsburgh	W. H. Badger	Gen. Supt	A
Lake Erie, Alliance & Southern	E. E. Scranton	Supt	1891
Lake Erie & Western	Geo. L Bradbury	Gen. Man	1891
Lake Shore & Mich. Southern	J. E. Childs	Asst. Gen. Man	1892
Lake Shore & Mich. Southern	M. E. Wattles	Supt	B
Lehigh Valley	H. Stanley Goodwin	Gen. Supt	—
Lehigh Valley	Robert H. Sayre	Supt. & Eng.	C
Little Rock & Fort Smith	Henry Wood	Gen. Supt	A
Louisville & Nashville	M. H. Smith	V.-Pres	1891
Louisville & Nashville	Chas. O. Parker	Supt	B
Louisville & Nashville	C. D Purdon	Div. Eng	—
Louisville & Nashville	G. K. McCormick	Res. Eng	1890
Louisville, N. Albany & Chicago	John B. Carson	V.-Pres. & Gen. Man.	—
Louisville, E. Albany & Chicago	Thos. D. Dunn	Gen. Supt	B
Louisville, N. Albany & Chicago	Jas. Baker	Gen. Pass. Agt	1890
Louisville, N. Albany & Texas	J. M. Edwards	V.-Pres. & Gen. Man.	—
Louisville, Evansville & St. Louis	C. A. Darlton	Supt	B
Los Angelos, Pasa & Glendale	John Cross	Pres.	1890
Los Angelos, Pasa & Glendale	W. F. McClure	Ch. Eng	1890
Mahony & Susq. Div. P. & R.	J. H. Olhausen	Supt	B
Maryland Central	Samuel Rea	V.-Pres	1892
Manitou & Pike's Peak	A. T. Tomlinson	Div. Eng	1890
Manitoba & N. Western	W. C. Baker	Gen. Supt	1890
Manitoba & N. Western	Geo. H. Webster	Ch. Eng	1890
Memphis & Little Rock	Rudolph Fink	Rec. & Gen. Man	B
Metropolitan of Portland, Or	Alfred F. Sears	Supt	—
Mexican National	C. A. Merrian	Supt	B
Michigan Central	B. Douglas	Bridge Eng.	1890
Minneapolis, Lynd. & Min.	Geo. H. Cooley	Ch. Eng	1890
Minneapolis, St. P. & S. S. Marie	T. D. Underwood	Gen. Man	1891
Minneapolis, St. P. & S. S. Marie	W. W. Rich	Ch. Eng	1890
Minnesota & N. Western	E. G. Russell	Asst. Gen. Supt	A
Missouri Pacific	W. H. Boyd	M. of Trans	B
Mobile & Ohio	T. M. R. Talcott	V.-Pres. & Gen. Man	A
Montana Central	H. C. Ives	Gen. Man	1890
Montana Central	N. C. Ray	Res. Eng	1891
Monterey & Mex. Gulf	J. A. Robertson	Gen. Man	1890
Monterey & Mex. Gulf	W. H. Wentworth	Ch. Eng	1890
Milford F., & Prov. & Hop	E. T. Logee	Gen. Supt	B
Milwaukee, L. Shore & Western	H. F. Whitecomb	Gen. Man	B
Milwaukee, L. Shore & Western	H. G. H. Reed	Gen. Supt	B
Milwaukee & Northern	C. F. Dutton	Gen. Supt	B
Milwaukee & St. Paul	T. D. Underwood	Supt.	B
Morgan's St. Louis & Texas	J. Kruttschmidt	Eng. & Supt	B
Nashville, Chattan. & St. L	Hunter McDonald	Asst. Eng	1891
Nashville & Florence	J. T. Craik	Ch. Eng. & Supt	B

Natchez, Jackson & Col	E. D. Frost	Gen. Supt	B
Naugatuck	George W. Beach	Supt	A
Nevada Central	F. W. Dunn	Gen. Supt	B
New Haven & Northampton	S. B. Opdyke, jr	Supt	B
New Orleans, Natchez & Ft. Scott	H. D. Jenkins	Ch. Eng	1891
New Orleans & Selma	Norman Webb	Rec	B
Newport News & Miss. Valley	J. L. Frazier	Supt	1891
Newport & Northern	H. H. Vreeland	Supt	1891
Newport & Wickford	Theo. Warren	Supt	B
New York & Boston R. Trans.	W. Rotch	Eng	1891
New York & New England	A. A. Jackson	Gen. Supt	—
New York & New England	J. W. Perkins	Ass. Rec	B
New York Central & H. River	J. M. Toucey	Gen. Supt	A
New York, New Haven & Hartford	C. S. Davidson	Supt	C
New York, New Haven & Hartford	O. M. Sheppard	Gen. Man	1891
New York, Lake Erie & Western	E. S. Bowen	V.-Pres	B
New York, Lake Erie & Western	S. M. Felton, jr	Asst. Pres	B
New York, Ont. & Western	S. W. Lampher	Supt. Tran	1890
New York, Ont. & Western	J. E. Childs	Gen. Supt	B
New York, Prov. & Boston	J. W. Miller	Gen. Man	—
New York, Prov. & Boston	J. B. Gardiner	Supt	B
New York, Susq. & Western	Chas. M. Heald	Pres	1890
New York, Susq. & Western	C. D. McKelvey	Supt	B
New York City & Northern	G. N. B. Edwards	Gen. Supt	A
New York, West Sh. & Buffalo	J. D. Layng	Gen. Man	B
New York & Sea Beach	W. O. McDowell	P.-Pres. & Gen. Man	B
New York, Pitts. & Chicago	G. W. Dixon	Supt	B
New York, Chic. & St. Louis	G. H. Kimball	Supt	B
Nicaragua C. C. Co	J. F. Le Baron	Gen. Supt	1892
Norfolk & Western	Joseph H. Sands	Gen. Man	A
Norfolk & Western	Charles Blackwell	Supt. M. P.	B
Norfolk & Western	Emile Low	Div. Eng	1890
North Western C. & N	E. T. Galt	Man	1890
North Western C. & N	J. Bailey	Supt	1890
Northern Pacific	T. F. Oakes	V.-Pres & Gen. Man	A
Northern Pacific	Robert Harris	Pres	B
Northern Pacific	D. R. Taylor	Supt	B
Ohio & Mississippi	J. F. Barnard	Pres. & Gen. Man.	1890
Ohio & L. R. W	B. S. Henning	Pres	C
Ohio Central	J. E. Martin	Rec	B
Old Colony	J. R. Kendrick	Gen. Man	A
Oregon & Washington T	F. Riffle	Ch. Eng	1891
Oregon Ry. & Nav	H. S. Rowe	Supt	B
Pennsylvania	S. M. Prevost	Gen. Supt. Trans.	1890
Pennsylvania	L. F. Loree	Supt	1891
Pennsylvania	Thos. J. Brereton	Supt	1890
Pennsylvania	O. G. McClellan	Supt	B
Pennsylvania	R. P. Snowdon	Ass. Eng	B
Pennsylvania	S. S. Blair	Supt	B
Pennsylvania	M. W. Thomason	Eng. Main. W	B
Pennsylvania	Robt. Pitcairn	Gen. A. & Supt	1890
Pensacola & Atlantic	W. D. Chipley	V.-Pres. & Gen. Supt	B
Peoria, Decatur & Evansville	G. L. Bradley	V.-Pres	B
Philadelphia & Reading	I. A. Sweigand	Gen. Supt	—
Philadelphia & Reading	M. F. Bonzano	Supt	1890
Philadelphia & Reading	I. A. Higgins	Sta. Agent	1890
Philadelphia & Reading	W. Lorenz	Ch. Eng	B
Pittsburgh, Cincinnati & St. Louis	M. J. Becker	Ch. Eng	1891
Pontiac, Oxford & Port Austin	James Houston	Gen. Supt	1890
Pittsburgh & Lake Erie	E. Holbrook	Gen. Supt	1890
Pittsburgh, Shenango & Lake Erie	I. T. Blair	Gen. Man	1890

Portland & Ogdensburg	I. Hamilton	Supt	B
Providence & Springfield	W. Tinkham	Pres	B
Providence & Worcester	Chas. Howard	Supt	A
Providence & Worcester	W. E. Chamberlain	Supt	B
Providence, W. & Bristol	W. Stone	Supt. & Eng	B
Pullman Palace Car Company	G. F. Brown	Gen. Supt	B
Prince Edward Island	L. B. Archibald	Supt	C
Quebec & Lake St. John	I. J. Scott	Man	A
Queensboro & Falls of R.	Chas. Seymour	Cons. Eng	1891
Qu'Appelle & Long Lake	H. S. Holt	Eng	1892
Richmond & Allegany	Decatur Axtell	Rec. & Man	B
Richmond & Danville	Julien A. Hall	Asst. Eng	1892
Richmond & Danville	F. M. Rutherfurd	Asst. Eng	1892
Richmond, Fred. & Potomac	E. T. D. Myers	Pres. & Gen. Supt.	—
Richmond & Petersburg	J. R. Kenly	Supt	B
Rock Island & Peoria	H. B. Sudlow	Supt	1890
Rochester & Pittsburgh	James T. Gardner	Gen. Supt	B
Rogersville & Jefferson	Chas. M. Lentz	Supt	B
Rome, W. & Ogdensburg	H. M. Britton	Gen. Man	A
San Antonia & Ar. Pass	B. F. House	Asst. Eng	1891
Savannah, Florida & West	H. W. Reed	Mast. R. W.	1891
San Pete Valley	S. Bamberger	Man. Director	B
Seaboard Air Line	John C. Winder	Gen. Man	1891
Seaboard & Roanoke	L. T. Myers	Supt. Trans	1891
Seattle Lake Shore & East	F. W. D. Holbrook	Man	1892
Shenango & Allegany	J. T. Blair	Gen. Man	B
Shenandoah Valley	David W. Flickwir	Supt	1891
Silverton	C. W. Gibbs	Ch. Eng	1890
Skaneateles	J. McNamara	Supt	A
South Florida	B. R. Swoope	Supt	A
South Carolina	John B. Peck	Gen. Man	B
Southern Pacific	J. A. Fillmore	Gen. Supt	1891
Southern Pacific	A. C. Bassett	Supt	B
Southern Pacific	J. Kruttschmidt	Supt	—
Southern Pacific	A. C. Hutchison	Gen. Man	A
Split Rock Cable	W. B. Cogswell	Gen. Man	1890
Staten Island, R. T.	Frank S. Gannon	Gen. Man	1891
St. Joseph & Desloge	T. T. Onderdonk	Gen. Supt	B
St. Johns & Lake Eustes	W. J. Jarvis	Supt	B
St. Louis, Alton & T. Haute	Geo. W. Parker	Gen. Man	B
St. Louis & San Francisco	H. L. Morrill	Gen. Man	A
St. Louis, Arkan. & Texas	A. H. Swanson	Rec	1891
St. Louis, Arkan. & Texas	H. G. Kelley	Res. Eng	1890
St. Louis & Cairo	C. Hamilton	Gen. Supt	B
St. Louis, Des Moines & North	H. H. Wade	Supt	A
St. Louis, Des Moines & North	C. F. Meek	Supt	B
St. Louis, Ft. Scott & Wichita	J. F. Miller	V.-Pres	B
St. Louis, Ft. Scott & Wichita	W. H. Norris	Train Mas.	B
St. Paul, Minn. & Manitoba	James J. Hill	Pres	B
St. Paul, Minn. & Manitoba	H. C. Ives	Asst. Gen. Man.	B
Stoney Creek	G. B. Boggs	Supt. & Eng	B
Suburban R. Transit	J. J. R. Croes	Ch. Eng	1892
Syracuse, Ont. & N. York	Albert Allen	Gen. Supt	A
Taveres, Orlando & Atlantic	T. M. T. McKennan	Gen. Man	A
Tennessee Coal & Iron	A. M. Shook	Gen. Man	B
Texas & Pacific	John A. Grant	V.-P. & Gen. Man.	1892
Toledo & Ohio Central	J. M. Ferris	Gen. Man	1891
Toledo & Ohio Central	Clifford Buxton	Ch. Eng	1891
Tioga	R. Du Puy	Supt. & Eng	B
Toledo, Peoria & Western	E. N. Armstrong	Gen. Supt	1891
Toledo, St. Louis & Kansas	A. H. Pettibone	Gen. Supt	B

Toledo, St. Louis & Kansas	S. R. Callaway	Ch. Eng	1890
Toledo, Ann Arbor & N. M	H. W. Ashley	Gen. Supt	B
Toledo, Col. & Cincinnati	Clifford Buxton	Ch. Eng	1891
Troy & Boston	J. Crandell	Supt	A
Ulster & Delaware	J. H. Jones	Gen. Supt	1891
Union Pacific	E. Dickinson	Gen. Man	1891
Union Pacific	S. T. Smith	Gen. Supt	B
Union Pacific	T. Appleton	Res. Eng	1891
Valley	W. Thornburgh	Gen. Man	1891
Virginia & Truckee	H. M. Yerrington	V.-Pres. & Gen. Man	B
Wabash	K. H. Wade	Gen. Supt	A
Wagner Sleeping Car Co	C. D. Flagg	Gen. Supt	—
Western Maryland	J. M. Hood	Pres. & Gen. Man	B
Western Maryland	B. H. Griswold	Gen. F. Agent	1891
Western N. York & Pennsylvania	R. Bell	Gen. Supt	1890
Wisconsin Central	S. R. Ainslie	Gen. Man	1890
West Shore	C. H. Bradley	Gen. Supt	A
Warren & Farnsworth	A. C. Wood	Gen. Man	B
West Virginia, C. & Pittsburgh	W. E. Porter	Gen. Supt	B
Worcester, Nashua & Roch	C. S. Turner	Pres. & Gen. Man	B
Williamsport & N. Branch	Ben. G. Welsh	Pres. & Gen. Man	B
York & Peachbottom	S. M. Manifold	Supt. & Eng	B

SUPPLEMENTARY REPORT OF A MINORITY OF THE COMMITTEE.

To the American Society of Civil Engineers:

From the Committee on Uniform Standard Time the undersigned begs leave to submit this supplementary report.

Time-reckoning is a branch of the subject of estimation of quantities and values, a subject whose parts are connected with one another. For example, payments by units of time are sometimes made for men's services, for supplies of food, heat, light and power, also for lodging and storage; hence to have time and money correspondingly reckoned facilitates computation. That light is thrown upon the subject of time reform by the analogy of monetary reckoning has been recognized by the Chairman of this Committee, who appended to the brochure issued by the Society last August a remark with reference to the customary division of the day into halves, distinguished as A.M. and P.M., as follows:

"If the practice be good and wise, why not extend it to the currency, and reckon by half dollars of fifty cents, in place of whole dollars of one hundred cents?" Absurd though it seems to Americans, that sort of thing has been done so often that it will be instructive to examine a few of the more conspicuous instances. Twenty years ago the Spanish monetary unit was the "escudo," or half the "duro," the dollar of Spain, from whom we borrowed our unit; but Spain has now adopted the monetary system of the Latin Union. The Austrian monetary unit is the "gulden," or half of the "thaler," or dollar of Austria, where the unit originated, and Austrian gold pieces are now coined with very simple relation to the Latin Union coinage. In great Britain there is now much reckoning by the shilling, or half of the florin, the florin containing 24 pence while the shilling contains 12. The florin is obviously analogous to the complete day; the shilling to the half day before or after noon. The florin is a coin introduced in 1849, and is among the most commonly used and is elaborately marked, "one florin, one tenth of a pound," and the number of shillings it contains is not marked upon it. The simple explanation of this and of many similar cases is that they are the signs of a transition from one reckoning to another. It was clearly the intention of the British Government in coining the florin to promote the abandonment of the customary reckoning by shillings, which has already been abandoned outside of the British Isles and of a part of the British Colonies, mostly African and Australian. The British reckoning by £ *s. d.*, is a survival of the work of Charlemagne, who took as his unit the weight of a pound (*libra*) of silver and divided it into 20 *solidi*, each of 12 *denarii*. It was spread not only over the wide territory subject to the mediæval Emperor, but also over England, Scotland

and America. In France the names became livre, sou and denier. Corresponding exactly to the reckoning by shillings in Great Britain, there still continues in France some petty reckoning in sous (twentieths of the franc or livre), testifying to the comparatively recent abandonment there of the old subdivision by the introduction of the system of the Latin Union. Similarly in America, reckoning in shillings has lasted within the memory of many members of this Society, though Canada abandoned it about thirty years ago; and the United States Government abandoned it a century ago, and in 1873 changed the half dollar and smaller silver coins to correspond with the Latin Union system. Our natural supposition is that the British *solidus*, or sh lling, will also pass out of use, and likewise the analogous forenoon and afternoon subdivision of the day, with its Latin abbreviations, A.M. and P.M.

One reason, prominent among others, for changing everywhere the reckoning of value and the weight of coins is that since Charlemagne's time our present arithmetical notation with "Arabic" figures has been introduced into Christendom, and has gradually superseded for most purposes the old Roman characters, some of the final steps of the change having been but recently taken. Roman numerals continued to be used for monetary reckoning in the British Exchequer accounts till 1831. As for time, they have lingered nearly down to the present day for dates on tombstones and on the title-pages of books; they have also been most commonly used on the faces of clocks and watches until recently, but a fashion has now sprung up of using Arabic figures for the faces of timepieces both small and great. As, in order to simplify reckoning, monetary systems have required to be adapted to the established arithmetic, so the customary reckoning of the subdivisions of the day, which has come down to us from the Dark Ages before the present arithmetic, has to be adapted likewise. The reason why the abandonment of the A.M. and P.M. division of the day is to be expected with confidence is that it is a part of a broad movement for the adaptation of the reckonings of quantity and value; and the invincible power of this movement is seen in the sweeping away of old coins and units to which people are very strongly and often capriciously attached. Time reform is bound to follow after coinage reform, which has already secured world-wide attention.

In Great Britain are said to have been recently circulated 130 000 copies of a pamphlet by R. T. Rohde, favoring a dollar or unit of one-fifth of the pound sterling. An international monetary conference was held in connection with the Universal Exposition at Paris last September. The present Conference of American Nations at Washington has to consider the adoption of a common silver coin, and has accordingly appointed a committee on Monetary Convention, consisting of two delegates from the United States and one each from Mexico, Honduras, Columbia, Bolivia and Chili. The greater part of the American nations

south of the United States have already assimilated their monetary systems to that of the Latin Union.

The reckoning of time, like the reckoning of money, concerns the whole people, engineers in common with others. Of the United States delegates to the Conference of American Nations, two are borne upon the rolls of the American Society of Civil Engineers. It is considered very desirable that the American Society of Civil Engineers should continue to maintain a committee qualified to contribute from the standpoint of our profession to the discussion of the important subject of time reform.

15th JANUARY, 1890.

FRED. BROOKS,
Member of Committee.

REPORT OF COMMITTEE ON SECURING INFORMATION AS TO IMPURITIES IN WATER SUPPLIES.

PRESENTED AT THE ANNUAL MEETING, JANUARY 15, 1890.

NEW YORK, January 15th, 1890.

To the AMERICAN SOCIETY OF CIVIL ENGINEERS:

The undersigned were appointed December 12th, 1889, a Committee, under a resolution directing them to ascertain the best means of concentrating all obtainable information relative to the contamination of water supplies, more especially due to natural causes, in such a manner as to secure useful results in the counteraction and anticipation of such causes, and to report to this annual meeting what further action should, in their opinion, be taken by the Society.

We have met in committee and considered the matter referred to us, as fully as the limited time since our appointment would permit. After discussion and comparison of views certain conclusions have been reached, which we now report.

As to the agency for collecting the desired information and rendering it available, the Committee concludes: (1) That the organization undertaking this work should be of a national and representative character, and one free from all political influences. (2) That there is no national governmental board at present dealing with or investigating subjects of this class in the public interest. (3) That the American Society of Civil Engineers, as a national body, is properly qualified by its organization and aims to undertake this work and to carry it on to a successful result, providing it can secure the cordial co-operation of its own members and of the State Health Boards, Government Medical Bureaus, and such laboratories as have been founded for the prosecution of biological researches.

Our reasons for this conclusion may be briefly indicated by the consideration that the American Society of Civil Engineers is the strongest professional guild yet established in America, and that its members are more directly concerned, as constructors and managers of most of the important water-works plants of the country, with the class of troubles which this Committee are specially directed to consider than are the members of any other body. We think, therefore, this Society is better able to place itself in satisfactory relations with the various water boards than is any other body with which we are acquainted.

As to the order and manner in which the work of concentrating information can best be proceeded with, the Committee concludes that, inasmuch as systematic arrangement of the information already in ex-

istence must be undertaken at an early stage, a commencement should be made at once in collecting and cataloguing all printed information now in existence on the causes of impurity and insalubrity of potable waters.

The Committee believes that the preparation, and ultimately the publication, under the auspices of this Society, of a complete bibliography of the subject, is eminently desirable.

To this end we suggest as our first important proposition for the consideration of the Society, the employment by the Secretary, at an expense to be determined by the Board of Direction, of a competent assistant, belonging to the engineering profession, whose duties shall be to assist a special committee in cataloguing (1) every publication now in the library of this Society which bears on this special subject; (2) in the same way cataloguing all matter to be found in other libraries, that may be accessible, including books, periodicals and similar publications, and (3) in doing such farther work in the way of corresponding with State Boards of Health, Water Controlling Boards, and other interested parties, as the Committee may require, with a view to collecting further information. The whole time of such an assistant would not be required, and the compensation to be made him would be graduated accordingly, and would properly be fixed by the Board of Direction.

As another means of cardinal importance in concentrating information and securing useful results to its own members, and to those Boards whose co-operation will be sought, the Committee concludes that this Society should own and maintain a complete collection of the literature of water in its chemical, microscopical, biological and sanitary aspects.

By way of emphasizing the importance of this branch of the proposed work, we may cite the fact that as yet there is no such complete public library of the subject in the United States. The only approximation to it is the collection of the late Professor William Ripley Nichols, at the Massachusetts Institute of Technology in Boston. This, however, while an excellent beginning and a noble monument to its learned founder, is far from complete, and hardly as accessible to engineers as would be such a library located at the Society's house in New York. The Committee are, therefore, of the opinion that the formation of a comprehensive library on the natural history and chemistry of potable water, is the very best method of centralizing the special information referred to by the terms of our instructions.

In the table prepared by Mr. Rafter (member of the Committee), and annexed to this report, there are presented some of the main features of the bibliography of our special subject, together with an estimate of the number of books required, and the probable cost of (1) a working library for quick every day reference, and (2) a complete library, including, in addition to working material, a fair proportion of books, pamphlets and other publications of historical value only; the esti-

mated cost of the working library being $4 355, and of the complete library $7 000.

The Committee do not wish to be understood as recommending to the Society the expenditure, immediately, of the sums required for the acquisition of such working and complete libraries of the special subjects as are here indicated.

We think, however, that the ultimate acquisition of a complete library is a thing quite within the means of the Society, and in the meantime we desire to call the attention of the Society and the Board of Direction to the desirability of beginning the collection of the special working library at the earliest possible moment.

Thus far no means of providing funds for this purpose, other than voluntary subscription of money and donations of books, has occurred to us, and we are obliged to leave that part of the subject in the hands of the Board of Direction.

The Committee comes now to the consideration of what it assumes to have been one important end of its appointment—the best means to be adopted for concentrating and presenting new facts, occurring in the course of daily experience, with regard to the deterioration of water supplies, due to natural causes, in order to the better understanding and treatment of this class of difficulties, the conditions governing which are at present so obscure. In laying special stress upon the importance of this branch of inquiry we do not, however, intend to be understood as excluding the study, also, of preventable or artificial causes of water pollution; but are of the opinion that investigation of these more palpable injuries to the purity of potable water is already much in advance of the special study here referred to.

It has been suggested that it would be well to have some person, who is thoroughly competent to investigate these special difficulties, employed by the Society, so that whenever serious trouble is reported with any water supply, he may at once visit the spot, and after full study of the matter report to the Society.

The Committee are not, however, prepared to make this as a proposition to the Society, and mention it only that it may receive due attention and discussion. Our conclusion is that the class of information to be sought for and digested should be gathered through a system of collaboration with, as has already been indicated, the Boards of Health of the several States, the Medical Bureaus of the General Government, and the most eminent authorities in the domain of biological experiment and research to be found in responsible control of the laboratories of public scientific institutions, and who are raised by their position above the reach of commercial influences.

The Committee has not felt authorized to communicate with State Boards of Health, or other authorities, to ascertain what is practicable in this direction, but has little doubt that if this Society takes the initia-

tory steps in the compilation of existing information, on the scale and in the manner proposed, they will be duly aided in the collection and concentration of new and additional information in the quarter mentioned.

With reference to the critical supervision of water supplies and the special investigations of their ailments, the Committee desires to say that the State Board of Health of Massachusetts, alone of all the States, has now an equipment and organization for a broad study of the complex questions connected with the salubrity of potable water, but that in a number of other States something is being done in the way of chemical analysis and general studies of questions of pollution, but hardly enough to cover fully the class of difficulties which we are considering. Ultimately, however, we have no doubt that a number of the principal State Boards will become fully equipped for this work, as its value is rapidly gaining recognition.

In the appointment of the Committee, reference to the difficulties arising from the impurities of their water supplies is confined to cities and towns on the Atlantic coast. On this point the Committee wishes to be understood as holding the opinion that any systematic investigation of the conditions and causes conducive to such difficulties should embrace the whole country. This conclusion is enforced by reports of these special troubles in the water supplies of several towns on the Pacific coast, and we have no doubt but that these troubles are impartially distributed over the whole world.

The Committee having now presented its report in accordance with the terms of its appointment, leaves the subject to be dealt with by the Society. If the engineering profession desires to retain the right to act as the final arbiter in the selection of sources and determination of plans of water supply, it must resolve to take the lead in the intelligent application of the results of scientific inquiry into the conditions affecting the purity of stored water and the subtle differences that separate waters of good keeping quality from others, equally good in appearance and chemical composition, that do not stand this test.

Respectfully submitted,

LEBBEUS B. WARD,
GEORGE W. RAFTER,
DESMOND FITZGERALD,
Committee.

TABLE of subjects to be included in a library on the chemistry and natural history of water, with estimate of number and cost of books.

SUBJECTS AND SUBDIVISIONS.	Working Library.		Complete Library.	
	No. Books.	Cost.	No. Books.	Cost.
(1)—Chemistry.				
(a)—general	50	$150	100	$250
(b)—analytical	15	60	50	175
(c)—journals	100	250	300	500
(2.—Physics.				
(a)—color	5	15	10	25
(b)—spectrum analysis	5	15	10	25
(c)—specific gravity	5	15	10	25
(3)—Microscopy,				
(a)—general	40	160	50	200
(b)—analytical	5	15	10	25
(c)—journals	100	300	200	450
(4)—Biology.				
(a)—general	25	70	50	120
(b)—special	50	150	100	250
(c)—journals	50	100	100	200
(5)—Cryptogamic Botany.				
(a)—general	10	40	25	150
(b)—algæ (except c and d)	40	350	50	400
(c)—desmids	10	100	10	100
(d)—diatoms	10	200	20	300
(e)—fungi	20	75	40	120
(f)—bacteria	30	90	50	120
(g)—miscellaneous	40	100	60	150
(h)—journals	100	300	200	400
(6)—Zoology.				
(a)—general	20	100	40	160
(b)—fresh water sponges	5	15	5	15
(c)—rhizopods	10	40	20	75
(d)—infusoria	10	80	20	140
(e)—polyzoa	5	30	10	50
(f)—vermes (general)	10	50	20	90
(g)—rotifera, entozoa, etc. vermes special	10	80	15	100
(h)—crustacea	15	100	40	175
(k)—insects and larvæ	15	120	30	175
(l)—miscellaneous	50	100	100	200
(m)—journals	100	300	200	400
(7)—Water Purification.				
(a)—filtration	10	25	20	40
(b)—precipitation	10	25	20	40
(c)—biological	10	25	20	40
(d)—miscellaneous (reports, etc.)	50	50	100	100
(8)—Sanitation.				
(a)—general	10	40	40	80
(b)—pollution of streams	20	40	40	60
(c)—hygiene	10	50	25	90
(d)—meteorology	5	20	15	40
(e)—vital statistics	30	60	50	100
(f)—etiology	20	50	40	80
(g)—journals	100	200	200	300
(9)—Miscellaneous Reports and Pamphlets	200	200	465	465
	1 335	$4 355	3 000	$7 000

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
Bigelow, Edward Manning	Chief Engineer Department Public Works, Pittsburgh, Pa.	Dec. 4, 1889
Cobb, Robert Linah	Chief Engineer Construction Louisville and Nashville R. R., Louisville, Ky.	Jan. 2, 1890
Douglas, Benjamin	Engineer Bridges Michigan Central Ry., Detroit, Mich.	J. June 1, 1887 M. Jan. 2, 1890
Farley, George McGrew	(Care Chief Engineer's office, Penna. Co.), Pittsburgh, Pa.	J. Apr. 6, 1887 M. Jan. 2, 1890
Fieser, Louis Frederick	Engineer Main. of Way, Indianapolis Div. Cleveland, Cincinnati, Chicago and St. Louis Ry., Indianapolis, Ind.	Jan. 2, 1890
Geddes, James Kennon	Chief Engineer Bellaire, Zanesville and Cincinnati Ry., Zanesville, Ohio.	Jan. 2, 1890
Grant, Emerson Warren	Assistant Engineer Construction Ft. Worth and Rio Grande Ry., Dublin, Texas.	Dec. 4, 1889
Holbrook, Henry Randolph	Chief Engineer Pueblo, Gunnison and Pacific R. R., Pueblo, Colo.	Jan. 2, 1890
Keith, Herbert Cary	Assistant Engineer New York and New England R. R., Boston, Mass.	Dec. 4, 1889
Randolph, Lingan Strother	Engineer of Tests Baltimore and Ohio R. R., Baltimore, Md.	Jan. 2, 1890
Rogers, Merritt Harrison	Resident Engineer Denver and Rio Grande R. R., Denver, Colo.	Jan. 2, 1890
Rowe, Robert Delos	Assistant Engineer Atchison, Topeka and Santa Fé Ry., East Las Vegas, N. M.	Jan. 2, 1890
Tompkins, John Anderson Baush	Chief Assistant Engineer Milwaukee, Lake Shore and Western Ry., Milwaukee, Wis.	Dec. 4, 1889
White, Henry Fisher	Chief Engineer Burlington, Cedar Rapids and Northern Ry., Cedar Rapids, Ia.	Jan. 2, 1890
Wilkins, William Glyde	Rooms 20 and 21, McCance Block, Pittsburgh, Pa.	Dec. 4, 1889

JUNIORS.

BEHRENS, WILLIAM FREDERICK. (Care S. M. Rowe, Chief Engineer A. and P. R. R.), Albuquerque, N. M..... Nov. 6, 1889

BLAKELEY, GEORGE HENRY ....Passaic Rolling Mill, Paterson, N. J..... Dec. 4, 1889

BYERS, MORTON LEWIS.....Mahoningtown, Pa..... Jan. 2, 1890

COLE, GEORGE WASHINGTON....Lebanon, Ill..... Dec. 4, 1889

TROWBRIDGE, FRANCIS CHARLES. (Care Black and Clawson Co.), Hamilton, Ohio..... Dec. 4, 1889

VIER, HENRY .....Assistant Engineer New York Central and Hudson River R. R., Buffalo, N. Y..... Dec. 4, 1889

FELLOW.

CLEMENT, VICTOR M.....Manager Bunker Hill and Sullivan Mining and Concentrating Co., Wardner, Idaho..... Jan. 8, 1890

CHANGES AND CORRECTIONS.

MEMBERS.

ARMINGTON, JAMES H.....Consulting Engineer Brooklyn Gas Light Co., Riverside, R. I.

BALDWIN, FRED. H.....(Drew, Baldwin & Co.) 45 Broadway, New York City.

BATES, CHARLES J.....(Care Sooysmith & Co.) 2 Nassau st., New York City.

BEAHAN, WILLARD .....(Care S. C. F. Collins) Odd Fellows' Bldg., St. Louis, Mo.

BECKWITH, LEONARD F.....Chief Engineer Consolidated Telegraph and Electrical Subway Co., 115 West 38th st., New York City.

BERRIAN, RICHARD M.....Atlantic Hotel, Bridgeport, Conn.

BILLIN, CHARLES E.....(Care Pencoyd Bridge and Construction Co.) 261 South Fourth st., Philadelphia, Pa.

BLAKE, EDWARD J.....Chief Engineer Chicago, Burlington and Quincy R. R., Chicago, Ill.

BODFISH, SUMNER H.....U. S. Geological Survey, Washington, D. C.

BRIGGS, ROSWELL E.....28 Barclay Block (P. O. Box 1262), Denver, Colo.

BRUSH, CHARLES B.....1 Newark st., Hoboken, N. J.

CHILDS, JAMES E.....General Manager New York, Ontario and Western R. R., 16 Exchange pl., New York City.

COOPER, SAMUEL L.....514 Warburton ave., Yonkers, N. Y.

CRAIG, CHAMBERS M.....Chief Engineer Montgomery, Tuscaloosa and Memphis R. R. (Alabama Midland R. R.), Troy, Ala.
CROSBY, BENJAMIN L.....Turner Bldg., Room 58, St. Louis, Mo.
DAVIS, JOSEPH P.....(Care Phœnix Construction Co.) 115 West 38th st., New York City.
DEFREES, MORRIS M. .....Ingall's Block, Room 53, Indianapolis, Ind.
EAYRS, NORMAN W.....Resident Engineer Terminal R. R. Association of St. Louis, Union Depot, Room 2, St. Louis, Mo.
ENDICOTT, MORDECAI T.....Civil Engineer U. S. N., 2402 Fourteenth st., N. W., Washington, D. C.
FINK, ALBERT.....Louisville, Ky.
FLAGG, J. FOSTER.....530 Third st., N. W., Washington, D. C.
FRIZELL, JOSEPH P.....60 Congress st., Boston, Mass.
GOULD, E. SHERMAN.....Consulting Engineer Vento Water Works, Havana, Cuba. (Care Runkle, Smith & Co., 40 Wall st., New York City).
HARDY, GEORGE R.....15 Cortland st., Room 30, New York City.
HARRIS, WILLIAM P.....General Superintendent Charleston, Cincinnati and Chicago R. R., Johnson City, Tenn.
HAZLEHURST, GEORGE B.....Acting General Superintendent Motive Power, Mt. Clare, Baltimore, Md.
HENNY, DAVID C.....(Care Land & Hawks) 23 Essex Block, Denver, Colo.
HERBERT, ARTHUR P.....Chief Engineer, Michoacan and Pacific R. R., Maravatio, Michoacan, Mexico.
HERSCHEL, CLEMENS.....Engineer and Superintendent East Jersey Water Co., 2 Wall st., New York City.
HIDER, ARTHUR.....Greenville, Miss.
HINCKLEY, JOHN F.....President Hinckley Stone Co., 2017 Rutgers st., St. Louis, Mo.
HOLT, HENRY S.....Windsor Hotel, Room 4, Montreal, Canada.
HOUSE, BRUCE F.....East Townsend, Huron Co., Ohio.
KUICHLING, EMIL.....Consulting Engineer, 209 N. Clinton st., Rochester, N. Y.
LE BARON, J. FRANCIS.....61 Broadway, Room 25, New York City.
LEDERLE, GEORGE A.....(Care George S. Morison) The Rookery, Chicago, Ill.
LOW, EMILE.....Division Engineer Clinch Valley Div. Norfolk and Western R. R., Bickley's Mills, Va.
MCCOLLOM, THOMAS C.....Civil Engineer U. S. N., U. S. Navy Yard, Boston, Mass.
MCKEE, SAMUEL B.....Assistant Engineer New York, Ontario and Western R. R., Middletown, N. Y.
MCVEAN, JOHN J.....Chief Engineer Detroit, Lansing and Northern R. R., Grand Rapids, Mich.
MORRIS, S. FISHER.....Geneva, N. Y.
NORMAN, GEORGE H.....Boston, Mass.

PEGRAM, GEORGE H.....3625 Finney ave., St. Louis, Mo.
PRIOR, CHARLES H.....Box 554, Minneapolis, Minn.
PURDON, CHARLES D.....Division Engineer Louisville and Nashville R. R., Louisville, Ky.
RICHARDSON, THOMAS F.....Chief Engineer Manitou and Pikes Peak R. R., Manitou, Colo.
ROGERS, FAIRMAN.....134 South 4th st., Philadelphia, Pa.
RUSSELL, NATHANIEL E.....American Graphophone Co., Bridgeport, Conn.
SAMPLE, JOHN H.....Chief Engineer Pittsburgh, Akron and Western Ry., Akron, Ohio.
SHINN, WILLIAM P.....(P. O. Box 356) Pittsburgh, Pa. (Telegraph address: East Liberty, Pa.)
SMITH, JOSEPH S .....119 West 43d st., New York City.
SWAN, CHARLES H.....Engineer Dept., Metropolitan Sewerage Commission, Lincoln st., Boston, Mass.
SYMINGTON, WILLIAM N. .....421 Olive st., St. Louis, Mo.
TALCOTT, THOMAS M. R.....Richmond, Va.
WROTNOWSKI, Arthur F.....Tampico, Mexico.
YEATMAN, Charles P.....Grandview, Tenn.

ASSOCIATES.

LEWIS, FRANK C.....50 Euclid ave., Cleveland, Ohio.
WARDER, JOHN H.....715 College ave., Elmira, N. Y.

JUNIORS.

ALLEN, THOMAS W.....789 Park ave., New York City.
BONNETT, CHARLES P.....76 South Broadway, Yonkers, N. Y.
BOOKER, BENJAMIN F.....Assistant Engineer Atchison, Topeka and Santa Fé R. R., Topeka, Kansas.
CRANE, WILLIAM E.....Renshaw Building, Room 9, Pittsburgh, Pa.
DURYEA, EDWIN.....(Care Chief Engineer Chicago and West Michigan Ry.) Grand Rapids, Mich.
ELLSWORTH, ALFRED B.....(Care Union Bridge Co.) Buffalo, N. Y.
ERLANDSEN, OSCAR.....(Care Pennsylvania, Poughkeepsie and Boston R. R.) Goshen, N. Y.
EWING, WILLIAM B.....(Care Am. Soc. C. E.) 127 East 23d st., New York City.
FERGUSON, WILLIAM L.....(Care A. L. Stout, Assistant Engineer Pennsylvania R. R.) Union Station, Baltimore, Md.
GOSLING, EDGAR B.....106 West Seventy-third st., New York City.
KASTL, ALEXANDER E.....First Assistant Engineer Tampico Harbor Works, Tampico, Mexico.
SEITZINGER, WILLIAM W.....933 North Broad st., Philadelphia, Pa.
SHALER, IRA A.....133 Manhattan ave., New York City.
TAPPAN, ROGER.....46 Chestnut st., Boston, Mass.
TENNEY, GEORGE O.....P. O. Box 233, New Decatur, Ala.
TUTHILL, JOB.....Chief Engineer's Office C. & W. M. Ry. and D. L. & N. R. R., Grand Rapids, Mich.

WADDELL, MONTGOMERY.....50 Broadway, New York City.
WILLIAMS, WILLIAM P.....120 Madison ave., New York City.
WOOD, CHARLES F.....97 Olive st., New Haven, Conn.
YOUNG, HERBERT A.....Train Master Mexican Central Ry., Aguascalientes, Mexico.

RESIGNATIONS.

MEMBERS.

	Date of Resignation.
HOOD, WILLIAM	January 16, 1890
RICHARDS, CHARLES B	December 31, 1889
VAN BROCKLIN, MARTIN	December 31, 1889

DEATHS.

ALLEN, HORATIO.....Elected Member December 4, 1867; Honorary Member March 4, 1874; died December 31, 1889.
CUSHING, OLIVER E.....Elected Member July 10, 1872; died January 17, 1890.
GREENE, BENJAMIN H.....Elected Member May 1, 1878; died January 4, 1890.
KEEFER, SAMUEL.....Elected Member January 6, 1869; died January 7, 1890.
WIGHTMAN, WILLARD H.....Elected Member September 5, 1888; died October 29, 1889.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XVI.—February–March, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

FEBRUARY 5TH, 1890.—The Society met at 20 o'clock, President William P. Shinn in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates were declared elected. As Members: Oscar F. Balston, Brooklyn, N. Y.; George Codwise Dickinson, Fort Montgomery, N. Y.; Joseph Hobson, Hamilton, Canada; John Alexander McDonald, Sydney, Australia; Maurice Stiles Parker, Winona, Minn.; Edward Clapp Shankland, Pittsburgh, Pa.; William Henry Warren, Sydney, Australia; George Leverett Wilson, St. Paul, Minn. As Juniors: Edward Hanson Connor, Buffalo, N. Y.; Amory Prescott Folwell, Glens Falls, N. Y.; Edward Etienne de Lancey, Sing Sing, N. Y.; Hugo S. Speidel, Paterson, N. J.; John Frederic Temple, Edge Moor, Del.; Henry Grattan Tyrrell, Pencoyd, Pa.; Thomas Tainter Watson, Morristown, N. J.

The Secretary announced the deaths of Oliver E. Cushing, M. Am. Soc. C. E., on January 17th, 1890; of Benjamin H. Greene, M. Am. Soc. C. E., on January 4th, 1890; of Samuel Keefer, M. Am. Soc. C. E., on January 7th, 1890, and of Willard H. Wightman, M. Am. Soc. C. E., on October 29th, 1889.

The election to Fellowship in the Society, on January 8th, 1890, of Mr. Victor M. Clement, of Wardner, Idaho, was announced.

A paper by Mr. Cope Whitehouse, on the Raijan Canal and Storage Reservoirs, illustrated by the stereopticon, was presented.

FEBRUARY 19TH, 1890.—The Society met at 20 o'clock, William G. Hamilton, M. Am. Soc. C. E., in the chair; John Bogart, Secretary.

The Secretary announced the death of Past President and Honorary Member, William J. McAlpine, on February 16th, 1890.

A paper on The Cause of Rain, by Franz A. Velschow, M. Am. Soc. C. E., was read and discussed by Messrs. Bogart, Brush, Collingwood, Emery and McClintock.

OF THE BOARD OF DIRECTION.

JANUARY 2D, 1890.—Applications were considered. Messrs. P. C. Asserson, James F. Lewis and John Bogart were appointed the committee in charge of arrangements for the Annual Meeting. Communication in reference to a proposed visit of the British Iron and Steel Institute considered.

JANUARY 13TH, 1890.—The Secretary presented the draft of the Annual Report, which was considered, amended and adopted. Report of the Treasurer presented. Applications considered.

JANUARY 18TH, 1890.—In accordance with the provisions of the Constitution, the following Standing Committees were appointed:

On Finance—Messrs. Charles B. Brush, Mendes Cohen and Robert Van Buren.

On Library—Messrs. Alphonse Fteley, Theodore Voorhees and William Ludlow.

The Secretary was directed to issue to letter-ballot the Codification of the Constitution and By-Laws and the proposed amendment to the Constitution with reference to method of amending. The Secretary was directed to issue to letter-ballot the memorial to Congress proposed by the Committee on Uniform Standard Time. The preparation of letter-ballots upon, with arguments for and against the adoption of the resolutions passed at the Annual Meeting, with reference to reconsideration of the action taken appointing a committee to report a set of standard rail sections; with reference to the appointment of a committee to report a uniform system of nomenclature of structures and parts of structures used in systems of sewerage, and with reference to the appointment of a committee on Units of Measurement, was ordered. The report of the Committee on Impurities of Domestic Water Supply was considered.

FEBRUARY 6TH, 1890.—Applications were considered. Appropriations made.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BALSTON, OSCAR F.	Chief Engineer, Kings Co. and Fulton Elevated Ry., 346 Fulton st., Brooklyn, N. Y.	Feb. 5, 1890
DICKINSON, GEORGE CODWISE.	Engineer in charge Bridge Division Hudson Suspension Bridge and New England R. R., Fort Montgomery, N. Y.	Feb. 5, 1890
FEIND, BERNHARD.	City Engineer's office, Chicago, Ill.	Jan. 2, 1890
GOULD, WILLIAM TILLOTSON.	Assistant Engineer, Mobile and Ohio R. R., Room 10, sixth floor, Equitable Bldg., St. Louis, Mo.	Jan. 2, 1890
HOBSON, JOSEPH.	Chief Engineer, Great Western Div. Grand Trunk Ry., Hamilton, Ontario, Canada.	Feb. 5, 1890
PARKER, MAURICE STILES.	Assistant Engineer, Great Falls Water Power Co., Great Falls, Mont.	Feb. 5, 1890
SHANKLAND, EDWARD CLAPP.	(Care Burnham and Root), The Rookery, Chicago, Ill.	Feb. 5, 1890
WILSON, GEORGE LEVERETT.	Assistant City Engineer, St. Paul, Minn.	Feb. 5, 1890

JUNIORS.

CONNOR, EDWARD HANSON.	Athens, Pa.	Feb. 5, 1890
DE LANCEY, EDWARD ETIENNE.	Box 175, Sing Sing, N. Y.	Feb. 5, 1890
FOLWELL, AMORY PRESCOTT.	Glens Falls, N. Y.	Feb. 5, 1890
LORINI, MARIO.	P. O. Box 646, Yonkers, N. Y.	Sept. 4, 1889
MILLER, RUDOLPH PHILIP.	Supervisor, Richmond and Danville R. R., Richmond, Va.	Jan. 2, 1890
TEMPLE, JOHN FREDERIC.	Edgemoor Bridge Works, Wilmington, Del.	Feb. 5, 1890
WATSON, THOMAS TAINTER.	Lock Box 58, Morristown, N. J.	Feb. 5, 1890

CHANGES AND CORRECTIONS.

MEMBERS.

BLACKWELL, CHARLES..... Juniata Iron and Steel Works, Pittsburgh, Pa.

BUSH, HARRY D .....Lidgerwood Mfg, Co., 96 Liberty st., New York City.

NOURSE, EDWIN G .....Engineer, North-Western Contracting Co., 218 La Salle st., Room 913, Chicago, Ill.

POU, ARTHUR.....Chief Engineer, Florida Midland and Georgia R. R., Valdosta, Ga.

PURDON, CHARLES D.....Care Anniston and Atlantic Ry., Anniston, Ala.

TOMPSON, GEORGE M.....Division Engineer Construction, Norfolk and Western R. R., Roanoke, Va.

DEATH.

MCALPINE, WILLIAM JARVIS..... Elected Member Feb. 3, 1853; Honorary Member Oct. 26, 1888; died Feb. 16, 1890.

March, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MARCH 5TH, 1890.—The Society met at 20 o'clock, President William P. Shinn in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates declared elected. As Members: Henry Wilcox Ayres, New Britain, Conn.; George Huntington Clark, Cedartown, Ga.; Porter Dwight Ford, Long Island City, N. Y.; Thomas James McMinn, New York City. As Juniors: Kennerly Bryan, New York City; Owen Lovejoy Ingalls, Washington, D. C.; Charles Francis Parker, New York City; Philo Sackett Perkins, Providence, R. I.; Ernest John Purslow, Santa Barbara, Cala.; Elmer Wayland Ross, Providence, R. I.; Clark Wallace Thompson, Duluth, Minn.; Irving Sparrow Wood, Providence, R. I.

The letter-ballot on the Codification of the Constitution, proposed by the Committee on Revision of the Constitution, was canvassed with the following result: Total ballots received, 209; ballots without signature, 17; votes in the affirmative, 188; votes in the negative, 1; not voting, 3. This proposed Codification of the Constitution having been regularly submitted as an amendment, and having received an affirmative vote of two-thirds of all the ballots cast, was declared adopted.

The letter-ballot on the proposed amendment to Article IX of the Constitution was canvassed with the following result: Total number of ballots received, 209; ballots without signature, 17; votes in the affirmative, 184; votes in the negative, 4; not voting, 4. This proposed amendment, having been regularly submitted, and having received an affirmative vote of two-thirds of all the ballots cast, was declared adopted.

This amendment relates to the method of amending the Constitution. It will be found on page 159 of the Proceedings, November, 1889.

The Constitution as now adopted will be issued with the Proceedings.

The letter-ballot on the adoption of the form of memorial proposed by the Committee on Uniform Standard Time was canvassed with the following result: Votes in the affirmative, 226; votes in the negative, 7. This form of memorial was thereupon declared adopted. (See Proceedings, January, 1890, page 55.)

A description of the details of construction of the plant of the New York Steam Company, stating in general the difficulties encountered and the methods adopted to overcome the same, with a discussion of the

measure of success attained with District Steam Systems in New York and elsewhere, was given by Dr. Charles E. Emery, M. Am. Soc. C. E. The description was illustrated by the stereopticon.

MARCH 19TH, 1890.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair; John Bogart, Secretary.

Mr. A. M. Wellington, M. Am. Soc. C. E., offered the following resolution, which was seconded by Mr. J. James R. Croes, M. Am. Soc. C. E., and was carried:

Whereas, A new and higher dam is about to be constructed immediately below the Bear Valley Arch Dam of California, the boldest arch dam in the world, in such a manner that said arch dam will be gradually relieved of strain, by letting in water below it, which process may be repeated several times, if desired, with but small waste of water; and

Whereas, These conditions afford a unique opportunity, never likely to recur, for determining the elasting yielding of said dam under strain, and the co-efficient of elasticity of masonry, as to which there is at present very imperfect information;

Resolved, That this Society requests any of its members residing on the Pacific coast, or any members of the Technical Society of the Pacific coast able to do so, to make arrangements to cause minute observations to be made of the movements of the dam as strain may be gradually relieved or applied.

Resolved Further, That the Secretary be requested to transmit a copy of the resolution to the Company owning the dam, with a request on behalf of the Society, that they will afford every facility to enable this unique opportunity to be properly availed of, and that they will, in default of other engineers offering to do so, themselves cause observations to be made by some competent observer, and cause them to be transmitted to this Society for publication in its Transactions.

Dr. Charles E. Emery continued his description of the plant of the New York Steam Company and the measure of success attained with District Steam Systems in New York and elsewhere, and the subject was discussed by Messrs. Fteley, Croes, Theodore Cooper, S. H. Prentiss, Worthen, Buck, Comstock and Emery.

American Society of Civil Engineers.

CONSTITUTION.

ADOPTED MARCH 5TH, 1890.

ARTICLE I.—NAME AND OBJECT.

1.—This Association shall be called the AMERICAN SOCIETY OF CIVIL ENGINEERS.

2.—Its objects shall be: The professional improvement of its Members, the encouragement of social intercourse among men of practical science, the advancement of engineering in its several branches, and the establishment of a central point of reference and union for its Members.

3.—Among the means to be employed for attaining these ends shall be periodical meetings for the reading of professional papers and the discussion of scientific subjects; the foundation of a library; the collection of maps, drawings and models; and the publication of such parts of the proceedings as may be deemed expedient.

ARTICLE II.—MEMBERSHIP.

1.—Civil, Military, Geological, Mining and Mechanical Engineers, Architects, and other persons who by profession are interested in the advancement of science, shall be eligible for admission in their appropriate class.

2.—The Active Members of the Society shall be divided into three classes, to be styled, respectively, Members, Associates and Juniors. Associates and Juniors shall possess all the rights and privileges of Members, excepting the right of voting.

3.—A Member shall be a Civil, Military, Mining or Mechanical Engineer who has been in active practice as such for seven years, or has graduated as Civil Engineer and been in practice for five years, and has had responsible charge of work as Chief, Resident, or Superintending Engineer for at least one year; not as a skillful workman merely, but as one qualified to design as well as to direct public work.

An Associate shall be a manager of a railroad, canal or other public work; a geologist, chemist or mathematician; a proprietor or manager of a mine or metallurgical works; an architect or a manufacturer; or one who, from his scientific acquirements or practical experience, has attained eminence in his special pursuit, qualifying him to co-operate with engineers in the advancement of professional knowledge; but shall not himself be practicing as an engineer.

A Junior shall be one who has had actual practice in some of the branches of civil, military, mining or mechanical engineering, for not less than two years; or, if a graduate of a scientific or collegiate institution, for not less than one year.

A person to be eligible to any class of Membership must not be less than twenty-one years of age.

4.—Honorary Members, not exceeding twenty in number in all, may be appointed as hereinafter provided. A person to be eligible as an Honorary Member shall be a gentleman of acknowledged eminence in some branch of engineering. Honorary Members shall be subject to no fees or assessments, and shall not be entitled to vote.

5.—Fellows of the Society shall be acceptable subscribers to the Fellowship Fund, proposed and elected as hereinafter provided: Any person, whether Member or otherwise, thus elected may become a Fellow.

Persons who are not Members, and who become Fellows, shall be entitled to all the privileges of the Society, except the right to vote. Members who become Fellows shall, in addition to all the rights they possess as Members, be entitled to receive duplicate copies of all the publications of the Society.

ARTICLE III.—Admissions and Expulsions.

1.—Nominations and proposals for admission to the Society shall be endorsed by at least five Members, who certify that they personally know the nominee or candidate, and that he is worthy of acceptance.

Proposals for admission to the Society of Engineers, not resident in North America, and who may be so situated as not to be personally known to five Members of the Society, may be endorsed for ballot by five Members of the Board of Direction, who shall, for such purpose, secure evidence sufficient in their opinion to show that the candidate is worthy of acceptance.

The proposal for Member, Associate or Junior shall contain a statement, over the candidate's signature, of his age, residence, the nature and term of his professional service, and that he will conform to the requirements of Membership if elected.

A proposal for transfer from one class to a higher shall be made by at least five Members, and shall state the age of the candidate, and the nature and term of his professional service since his admission to the Society. Such statement shall show a degree of qualification sufficient to render the proposed eligible to election in the class to which transfer is asked. Upon the approval of the Board of Direction, the candidate shall be balloted for, as provided in the election of Members; and when the transfer is made, he shall be required to pay as an additional entrance fee the amount of the difference between the entrance fees of the two classes.

2.—A nomination or proposal shall be presented at the next regular meeting of the Board of Direction following its receipt; the Board of Direction shall thereupon send to all Members of the Society a notice that such person is a candidate for election. Not less than 30 days thereafter the Board shall consider the application, and if approved and the applicant (if for admission as Member, Associate or Junior) classed with his consent, a day shall be fixed

for the ballot to be canvassed, which shall be at a regular meeting of the Society, not less than twenty-five days thereafter.

When such day is fixed, the Secretary shall conspicuously post in the rooms of the Society the name and class of the nominee or applicant, his residence, occupation, and the names of his proposers; he shall mail to each Member whose address is known a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, and request the recipient to vote thereby or in person in the usual manner on the day fixed, when an open canvass of the votes cast shall be made, and the result announced.

Five or more ballots cast in the negative shall exclude. Members notified but not responding shall be classed as having voted in the affirmative. In case of the non-election of any person balloted for, no notice shall be taken thereof in the minutes.

3.—The proposers of any rejected candidate may, within three months after such rejection, lay before the Board of Direction written evidence that an error was then made, and ask for a reconsideration of the proposal, which shall be granted on sufficient grounds, and if a ballot has been taken, another shall be ordered.

4.—The Board of Direction, upon receipt of letters from not less than eight Members in good standing, requesting a reconsideration of the proposal of any rejected candidate, and stating the reasons for the request, may, if it considers the reasons to be sufficient, order another ballot to be taken; whereupon the Secretary should mail to each Member whose address is known, a notice of the same, with a letter-ballot in such form as shall be prescribed by the Board of Direction, requesting the recipient to vote thereby, or in person, on the day appointed by the Board to canvass the ballot. The ballot shall be an open one, and five or more negative votes shall exclude. The Board shall designate a regular meeting at which the ballot shall be canvassed, which meeting shall be not less than twenty-five days after the Secretary has issued the notice above mentioned.

5.—Honorary Members shall be appointed by a unanimous vote of the Board of Direction and such Past-Presidents of the Society as shall be at the time Members of the Society and resident in the United States.

6.—Candidates for Fellows shall not be required to present themselves; those making the nomination shall state the ground therefor, and certify that the nominee will accept, if elected.

Fellows shall be elected in the same manner as Honorary Members.

7.—Whenever any person is elected, the Secretary shall immediately inform him of the same, by letter (Form B in the Appendix), and the election of Honorary Members shall be likewise communicated to them, by a letter suited to each particular case; but no person shall be considered an Honorary Member unless he signify within six months his acceptance of Membership.

8.—On being elected, the candidate must subscribe to the Constitution and By-Laws (in the terms set forth in Form A in the Appendix), and pay to the Treasurer of the Society such sum as may be determined upon, under the authority of Article IV of the Constitution, as the regular entrance fee and yearly assessment, when he will be entitled to receive a certificate of Membership.

If this be not done within six months from the notification of the election, said election shall be considered void.

9.—Persons elected and duly qualified, who reside within fifty miles of the Post-office in the City of New York, shall be deemed Resident; and those who reside beyond this limit shall be deemed Non-Resident. The Membership of any person shall begin on the day of his election.

10.—Every person admitted to the Society shall be considered as belonging thereto and liable to the payment of all assessments, until he shall have signified to the Secretary his desire to withdraw; when, if his dues have been fully paid up, his name shall be erased from the list of Members.

11.—Any person admitted to the Society who shall refuse to pay any asssessment or other dues to the Society, or who shall neglect the same for the term of six months after due notice is issued (in the Form C in the Appendix), shall cease to be a Member.

12.—Upon the written request of ten or more Members, that for cause therein set forth, a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there is sufficient reason, shall advise the accused that his resignation will be accepted. He may, upon demand, receive a copy of the charges against him, and present a written defense. Two months after such advice was given, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a satisfactory defense made, will then notify the Member that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Society by letter-ballot. In case no appeal be made, the Board of Direction will expel the Member and notify him and the Society of the same, or of the action of the Society on appeal, and the above shall in any event be the only public announcement of the matter.

ARTICLE IV.—Dues.

1.—The amount of entrance fee to be paid, as well as the annual dues or assessments for the support of the Society, shall be determined from time to time at some regular meeting of the Society, provided that notice of intended action thereon shall have been given at a previous regular meeting. No alteration in the amount of said fees or assessments shall apply to the fiscal year during which it is made, but shall take effect on and after the first day in January next succeeding the day of the date of said alteration. Members who become Residents or Non-Residents by removal into or beyond the limits prescribed in Article III, shall be subject to assessment in the class in which they were on the day of the Annual Meeting, as may appear upon the records of the Society or by written notice to the Secretary.

2.—Any Member of the Society, not in arrears for dues, may compound for the payment of all future annual dues, except as hereinafter provided, by the payment of Two Hundred and Fifty Dollars.

Provided, That all Resident Members, or those who may hereafter become such, shall be and remain liable to the annual payment of the difference between the annual dues of Resident and Non-Resident Members, as the same now is or may be established from time to time; but any Member may at any time compound for the future payment of all annual dues of every nature and

kind, by the payment of Seventy-five Dollars in addition to the Two Hundred and Fifty Dollars hereinbefore provided for.

Provided, however, that each person duly elected a Member shall pay the entrance fee and also the annual dues for the current year of his election.

Provided, also, that any Member desiring to compound for future annual dues shall have paid the annual dues for the current year before the compounding sum may be available.

Members compounding shall sign an agreement that they will be governed by the Constitution and By-Laws of the Society as they are now formed, or as they may be hereafter altered, amended or enlarged; and that in case of their ceasing to be Members from any cause whatever, the amount theretofore paid by them for compounding, and for entrance fees and annual dues, shall be the property of the Society.

All moneys thus paid in commutation of annual dues shall be invested as a permanent fund, the interest thereof only being subject to appropriation for current expenses.

3.—The annual contributions shall become due for the ensuing year on the first day of January, and shall be payable in advance. It shall be the duty of the Secretary to notify each Member of the amount due for the ensuing year at the time of giving notice of the Annual Meeting.

4.—Persons who shall be elected Members of this Society after six months of any fiscal year shall have expired, shall pay only one-half of the amount of dues for that fiscal year otherwise required.

5.—Members in arrears for more than one year's annual dues shall not be allowed to vote until such dues are paid.

6.—The Board of Direction may, for sufficient cause, excuse from payment of annual dues any member distinguished in his professional career, and who, from ill-health, advanced age, or other good reason assigned, is unable to pay such dues; and the Board may remit the whole or part of assessments in arrears, or accept, in lieu thereof, desirable additions to the Library and Museum.

7.—The Fund established by the Subscriptions of Fellows shall be called the Fellowship Fund, ten thousand dollars of which shall be devoted exclusively to the publication of the papers read before the Society.

ARTICLE V.—Officers.

1.—The officers of the Society shall consist of a President, two Vice-Presidents, a Secretary, Treasurer, Librarian, and five Directors.

2.—The President, Vice-Presidents, Secretary, Treasurer and Directors shall constitute a Board of Direction, and shall be the Trustees of this Society, under the provisions of law.

ARTICLE VI.—Management.

1.—The duties of the Board of Direction shall be: To have a general care of the affairs of the Society; to apply the funds in the Treasury; to recommend the amount of assessments and appropriations for specific purposes, and to make a report on the affairs of the Society, embracing the report of the Treasurer, at the Annual Meeting.

If this be not done within six months from the notification of the election, said election shall be considered void.

9.—Persons elected and duly qualified, who reside within fifty miles of the Post-office in the City of New York, shall be deemed Resident; and those who reside beyond this limit shall be deemed Non-Resident. The Membership of any person shall begin on the day of his election.

10.—Every person admitted to the Society shall be considered as belonging thereto and liable to the payment of all assessments, until he shall have signified to the Secretary his desire to withdraw; when, if his dues have been fully paid up, his name shall be erased from the list of Members.

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5.—Members in arrears for more than one year's annual dues shall not be allowed to vote until such dues are paid.

6.—The Board of Direction may, for sufficient cause, excuse from payment of annual dues any member distinguished in his professional career, and who, from ill-health, advanced age, or other good reason assigned, is unable to pay such dues; and the Board may remit the whole or part of assessments in arrears, or accept, in lieu thereof, desirable additions to the Library and Museum.

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The Board of Direction shall determine the order of its stated and special meetings; provide for an Executive Committee to act in the absence of a quorum, or during the intervals between the meetings; prescribe regulations for balloting, and generally conduct the business affairs of the Society. The record of the proceedings of the Board of Direction, made since the last regular meeting of the Society, shall be read at each regular meeting.

The Board of Direction shall meet within one week after their election, and the first business in order shall be the appointment of a Standing Committee of three on Finance, and a Standing Committee of three on Library.

2.—The President of the Society shall have the general supervision of the business and correspondence of the Society; he shall be an Honorary Member of all committees, but shall have no vote on such committees.

During the Annual Convention the President shall deliver an address giving a summary of engineering progress during the preceding year.

The President, and, in his absence, the Vice-Presidents in rotation, shall preside at all the meetings of the Society; and in case of their absence, a President *pro tempore* shall be appointed.

In all cases where the Constitution or resolutions of the Society or of the Board of Direction require specific duties to be performed by the President, the senior resident Vice-President present shall perform such duties in absence of the President, on receiving notice from the President to perform such duties.

3.—The Secretary shall keep an accurate record of all the transactions of the Society and the Board of Direction, and shall issue all notices.

A record of all donations to the Society, whether in money, books, maps, models or other articles of value, with the names of the donors, shall be entered by the Secretary in a book provided for that purpose, to be kept at the rooms of the Society.

4.—The Treasurer shall have charge of the funds of the Society, receive all assessments, and pay all bills and orders approved by the President, or the Chairman of the Finance or Library Committees. The duties of the Secretary and Treasurer may be united in the same person, if the Society think proper. Moneys belonging to the Society, paid to any of its officers, shall, with a statement showing for what the payment was made, be promptly transmitted to the Treasurer, who shall receipt therefor.

The Treasurer shall deposit the moneys and invest the funds of the Society in its name, by and with the advice of the Board of Direction; he shall sign all checks.

The annual report of the Treasurer shall be certified to by at least two Members of the Committee on Finance.

5.—It shall be the duty of the Librarian to take charge of the library of the Society, and to see that all books are marked with the name of the Society, numbered and recorded in a catalogue. In respect to the management of the library, he shall conform to such regulations as may be prescribed by the Society, or by the Board of Direction.

A book shall be kept by the Librarian, in which Members may enter the title of any book, map or plan which they may wish to have added to the Library.

6.—The Finance Committee shall have supervision of the accounts of the Society, shall examine all bills and demands, audit the accounts of the Treasurer, and certify to his annual report.

No indebtedness shall be incurred for the Society, except under such rules as prescribed by the Board of Direction.

No bill shall be paid for the Society until it has been certified by the person authorized to contract it, and audited by the Committee on Finance.

7.—The Library Committee shall have supervision of the rooms, printing and library of the Society, and shall apply to the purchase of books, or other articles of permanent value to the Society, such sums as may be appropriated.

The books, maps and other property of the Society shall only be removed from the rooms under such rules and regulations as shall be prescribed by the Committee on Library, and approved by the Board of Direction.

Every Member shall have the privilege of introducing visitors to the rooms while the Society is not in session, by writing their names and his own in a book provided for that purpose.

The rooms of the Society shall be open from 9 A. M. to 4 P. M., every business day, unless otherwise determined by the Board of Direction.

8.—When a paper is presented to the Society, the Secretary shall at once examine it, and report thereon to the Committee on Library, with reference to this standard: Papers containing old matter, readily found elsewhere, those specially meant to advocate personal interests, those carelessly prepared or controverting established facts, and those purely speculative or foreign to the purposes of the Society, should be rejected. The Committee shall then determine whether such paper may go before the Society. They can return it to the writer for correction and emendation, and call to their aid one or more Members of special experience relating to the subject treated, either to advise on the paper or to discuss it. Such papers as in the judgment of the Committee should go before the Society, shall promptly, upon their acceptance, be printed; others shall be recorded in books provided for the purpose. When, however, the Library Committee does not feel authorized to publish a paper, they may provide an abstract thereof, which, when approved by the author, may be published instead of the original paper.

9.—Special committees to report upon engineering subjects shall be authorized only by a majority of the votes cast by the Society, and in the following manner: Any resolution proposing such a committee shall be referred to the Board of Direction, which shall examine the same and report to the Society a concise statement of the argument for and against the appointment of such committee, which statement shall be printed and issued to the Society with a letter-ballot; or, if the Board fails to report within one month, the letter-ballot shall be issued without comment.

10.—The permanent place for the transaction of the business of this Society shall be in the City of New York.

11.—The records of the Society shall at all times be open to Members, and such books of accounts shall be kept in its rooms as the Board of Direction may designate.

ARTICLE VII.—Nomination and Election of Officers.

1.—The President, two Vice-Presidents, a Secretary, Treasurer, Librarian, and five Directors, shall be elected by written ballot, by a majority of votes, at the Annual Meeting of the Society. The term of office shall begin at the close of the Annual Meeting, and continue for one year, or until other officers are elected. Any vacancy occasioned by resignation or otherwise may be filled at the next monthly meeting after notice of said vacancy.

2.—Votes for officers of the Society at the Annual Meeting in January may be sent by mail, enclosed in two sealed envelopes, the outer one of which shall be endorsed by the voter's signature, and all such votes shall be counted on the first ballot for officers.

3.—If it should appear that for any office a majority of the votes cast was not for one person, the meeting shall proceed to vote by ballot in the usual way for such officer, the choice of candidates being limited to the two persons not elected for whom the greatest number of votes had been previously cast for such office. When two or more persons have the highest and an equal number of votes at any election for officers, the Society shall elect the officer from among those having the highest and equal number of votes.

4.—At the Annual Convention a Nominating Committee of five Members, not officers of the Society, shall be appointed by the Convention. This committee shall present to the Board of Direction, on or before the first day of November ensuing, the names of the persons selected by them as candidates for officers. Of these, at least one Vice-President, three Directors, the Secretary and the Treasurer shall be Resident Members.

5.—The Board of Direction shall thereupon cause such list to be posted in the rooms of the Society, and shall issue, at least twenty days before the Annual Meeting, a letter-ballot containing the names thus proposed.

6.—Any five Members, not officers of the Society, may present to the Board of Direction, on or before December 1st, a list of names proposed by them for officers, which lists or list shall also be issued for ballot.

7.—No member of any Nominating Committee shall be presented by such committee as a candidate for office.

ARTICLE VIII.—Meetings.

1.—The Annual Meeting for the election of officers and hearing the Annual Reports shall be held on the third Wednesday in January. The Board of Direction shall lay before the meeting a report of the state of the Society, together with a statement by the Treasurer, verified by the Committee on Finance of the funds of the Society, and the receipts and payments during the year ending on the 31st December preceding.

2.—A Convention of the Society for professional discussion and social intercourse shall be held annually at such place as the Society may determine, and be presided over by a Chairman selected from among Members not officers of the Society. During the Convention, a regular meeting of the Society, to be presided over by the officers of the Society, may be held for the transaction of business.

On the evening of the first day of the Convention, there shall be held a meeting to which the public may be invited, and at which the President of the Society shall deliver an address.

3.—The regular meetings of the Society shall be held on the first Wednesday in each month. There shall be meetings of the Society held on the third Wednesday in each month. for professional improvement and the encouragement of social intercourse among men of practical science, at which papers shall be read and subjects discussed relating to the theory and practice of engineering, and no other business transacted. The Board of Direction may suspend meetings of the Society in the months of July and August.

4.—The Board of Direction may call meetings of the Society when they deem it expedient, and shall be bound to do so at the written request of seven Members, stating the purpose of such meeting. Ten days' notice shall be given to Members of any special meeting; the purpose thereof shall be stated in the notice, and no other business shall be taken up at that meeting.

5.—At any regular meeting of the Society, seven Members shall constitute a quorum for the transaction of business. But the action of a less number at any monthly meeting at which a quorum is not present, may be entered on the journal, provided such action does not affect the rights of the association, or any Member thereof.

6.—At the regular meetings of the Society, the following order shall be observed in the transaction of business, unless set aside, for the time being, by a vote of the members present:

1st. The record of last meeting to be read, approved and signed by the Chairman and Secretary.

2d. Candidates for Membership to be balloted for.

3d. Communications received since the last regular meeting to be announced, and read if required.

4th. Communications from Members present to be read.

5th. Communications from the Board of Direction to be brought forward.

6th. Reports of Committees to be called for.

7th. Unfinished business to be taken up.

8th. New business to be proposed.

9th. Questions for debate to be discussed.

The same order shall be observed, as far as practicable, at the meetings of the Board of Direction.

7.—The following rules of order shall be observed:

1st.—All decisions of the Chair, on points of order, shall be conclusive, unless reversed on appeal to the meeting.

2d.—Every motion shall be first stated by the President, before debate or taking the question, and every motion shall be reduced to writing, if the President or any Member desires it.

3d.—When a question is under debate, no motion shall be in order, unless for the previous question; to postpone indefinitely; to postpone to a day certain; to lay on the table; to commit; to amend; or to adopt.

4th.—A motion to adjourn shall always be in order, and shall be decided without debate.

5th.—If required by one-fifth of the whole number of Members present, the ayes and nays upon any question shall be called, and entered upon the journal.

6th.—No motion for reconsideration shall be in order, unless one of the majority shall move such reconsideration. A motion for reconsideration being put and lost, shall not be renewed, nor shall any subject or vote be a second time reconsidered without unanimous consent.

ARTICLE IX.—Amendments.

Proposed amendments to this Constitution must be reduced to writing and signed by not less than five Members, and be submitted and acted upon as follows:

1st.—Amendments presented to the Secretary on or before the first Wednesday in November shall be sent by letter to the several Members of the Society at least twenty-five days previous to the Annual Meeting. Such amendments shall be in order for discussion at such Annual Meeting, and may be amended in any manner pertinent to the original amendments by a majority vote of the Annual Meeting, and if so amended shall be voted upon by letter-ballot in form as amended by the Annual Meeting; if not so amended they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in March.

2d.—Amendments presented to the Secretary on or before the first Wednesday in April shall be sent by letter to the several Members of the Society at least twenty-five days previous to the Annual Convention. Said amendments shall be in order for discussion at the Business Meeting during such Annual Convention, and may be amended in any manner pertinent to the original amendments by a majority vote of the Business Meeting during the Annual Convention, and if so amended, shall be voted upon by letter-ballot in form as amended by said Business Meeting; if not so amended they shall be voted upon by letter ballot as submitted. The vote to be counted at the first regular meeting in October.

3d.—An affirmative vote of two-thirds of all ballots cast shall be necessary to the adoption of any amendment.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XVI.—April, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

APRIL 2D, 1890.—The Society met at 20 o'clock, President William P. Shinn in the chair; John Bogart, Secretary. Ballots for membership were canvassed and the following candidates were declared elected. As Members: James Henry Covode, Chili, S. A.; George Stewart Davison, Pittsburgh, Pa.; Peter Conover Hains, Washington, D. C.; Alexander William Jardine, Queensland, Australia; Thomas Henry McCann, Hoboken, N. J.; Gaylord Thompson, Yonkers, N. Y. As Associate: Lewis Roberts Pomeroy, New York City. As Juniors: Robert Walter Creuzbaur, Brooklyn, N. Y.; Charles William McMeekin, Des Moines, Ia.

The Secretary, before announcing the result of the canvass of the letter-ballots upon the resolutions as to Standard Rail Sections, as to Units of Measurement, and as to Nomenclature of Structures and Parts of Structures used in Sewerage, said: "Mr. President, in canvassing the ballots upon the different resolutions this evening, there were found ballot papers inclosed in seven of these envelopes which were not signed on the voting paper, although the name of the member who transmitted them was indorsed on the outside of the envelope. While the result would not be at all altered in any case this evening by this state of circumstances, yet it has seemed proper to report the matter, in order that any requisite action may be taken and a decision arrived at as to a similar case in the future."

The CHAIR.—Will you take any action on the subject presented by the Secretary in regard to the ballots, the form of which requires a signature?

Mr. J. J. R. CROES.—I suggest that the Chair make a ruling, and if the ruling be appealed from, the vote of the Society be taken.

The CHAIR.—I should rule on that question that the ballots should be used in accordance with the directions printed on them. Therefore, if on the face of the ballot there is required that a member sign his ballot and he does not sign, it should not be counted as a ballot.

I wish to take this opportunity to say that, in the opinion not only of the Chair, but of the member who occupies the chair (and it has been his opinion for a long time previously), it is not creditable to engineers, whose duties require them to be precise in every way, that so many ballots come which are irregularly signed and incomplete in various ways. The members of this Society, if they take enough interest to vote at all, should certainly take interest enough to see that their ballots are made out so as to express their intentions in casting the ballot; and there is no man, or set of men, upon whom this duty is more incumbent, scarcely any set of men upon whom it is as incumbent, as upon engineers. I would like to impress upon the Society at large that absolute accuracy is the very foundation of engineering, and that a man who will send in ballots to this Society unsigned, with yes written where no should be, or with no writing at all, is a man who, if he is not very careful, will fall into habits which will ruin his reputation as an engineer.

Mr. A. FTELEY.—Mr. President, as I believe that there will be no appeal from the ruling of the Chair, I would suggest that the Secretary be requested to send to each member of the Society a copy of the remarks just made by the Chair. (Seconded by Mr. Croes.)

This motion was carried.

The result of the canvass of the letter-ballots was then announced, as follows:

On the letter-ballot on the resolution adopted at the Annual Meeting, as follows:

Resolved, That the Committee appointed to report to the Society a set of Standard Rail Sections, of weights beginning at 40 pounds and advancing by increments of 5 pounds to 100 pounds per lineal yard, is hereby discharged, with the thanks of the Society,

there were votes in the affirmative, 92; votes in the negative, 125. This resolution was declared lost.

On the letter-ballot on the resolution adopted at the Annual Meeting, as follows:

Resolved, That a Committee be appointed on Units of Measurements,

there were votes in the affirmative, 96; votes in the negative, 85. This resolution was declared adopted.

On the letter-ballot on the resolution adopted at the Annual Meeting, as follows :

Resolved, That a Committee of five be appointed to report a Uniform System of Nomenclature of Structures and parts of Structures used in Systems of Sewerage in America,

there were votes in the affirmative, 90 ; votes in the negative, 99. This resolution was declared lost.

The Secretary announced the death, on March 30th, 1890, of Frederic Graff, Past President of the Society.

A paper on Tunnel Surveying on Division 6, New Croton Aqueduct, by F. W. Watkins, M. Am. Soc. C. E., was read and discussed by Messrs. Wegmann, North, Gowen, Brush, F. D. Fisher, Fteley and Watkins.

APRIL 16TH, 1890.—The Society met at 20 o'clock, Vice-President A. Fteley in the chair ; John Bogart, Secretary.

A Record of Tests of Steel Bands, presented by William Metcalf, M. Am. Soc. C. E., was read by the Secretary ; the subject was discussed by Messrs. Theodore Cooper and A. Fteley.

The results of some Tests of Cement were presented by John Bogart, M. Am. Soc. C. E., and the subject was discussed by Messrs. Collingwood, Brush, Norton, Cooper, Fteley, Crowell, T. C. Clarke, Hering, Emery, Brendlinger, F. H. Baldwin, Crane and John Bogart.

OF THE BOARD OF DIRECTION.

MARCH 6TH, 1890.—Applications were considered. The time and place of the Annual Convention were considered. The subject of the appointment of Tellers to canvass ballots at the regular meetings of the Society was considered. Appropriations made.

APRIL 3D, 1890.—Applications were considered. The subject of the appointment of a committee to present to Congress the memorial of the Committee on Standard Time was considered. The appointment of a Committee on Units of Measurements was considered. Arrangements as to Annual Convention were considered.

MEMOIRS OF DECEASED MEMBERS.

LOUIS LESAGE, M. Am. Soc. C. E.

DIED JANUARY 9TH, 1889.

Louis Lesage was born at L'Assomption, Canada, August 13th, 1827. His parents were Rose Braume *dit* Bordelais and Mr. Louis Lesage, a Canadian farmer. The eldest of a family of eighteen children, the young Louis was destined for the priesthood, and his early education was entirely with that object in view. In 1839, he was sent to L'Assomption College, where he remained for ten years, completing a thorough course of classical studies; in mathematics he stood first in his class. Leaving the college he continued the study of theology at the Grand Seminary, and, for a time, acted as secretary to Mgr. Bourget with Mgr. Fabre and Rev. Canon Le Blanc, but after passing his first examination for holy orders, he withdrew, feeling that he was not called to enter the priesthood.

Mr. Lesage now took the decisive step which shaped his career, and entered upon the study of civil engineering and architecture, under Messrs. Ostell & Perrault, in 1851. He exhibited remarkable aptness in his new profession, and during the four years from 1852 to 1856 was engaged in general engineering practice, including railway and canal work, assisting during this period Messrs. Laberge & Labell, contractors, by whom he was employed, in the erection of numerous public buildings in Montreal, among others the Court House, St. Peter's Church, and the St. Pelagie Convent. The conspicuous talent displayed by the young engineer in these constructions led to his appointment as Assistant Commissioner of Public Works, and, together with Mr. Trudeau, he surveyed the proposed railway to Riviere du Loup.

Returning to Montreal, he was engaged on the harbor improvements as Engineer, and in 1853, was made Assistant Engineer in the office of Mr. Thomas C. Keefer, Past President Am. Soc. C. E., who was at that time constructing the first Montreal water works. In 1856, Mr. Lesage was appointed to the position of Superintendent of Water Works, which he held until his death. His first noticeable work in this department was the adaptation of the old system of water pipes to those of the new reservoir. For the new reservoir itself the city was indebted to the energy and skill of Mr. Lesage. To him is said to be due the first idea of an inland cut with turbines and reservoirs. In bringing the work to a successful termination he had the advantage of the association with him of such eminent specialists as Mr. Keefer, Mr. James B. Francis, Past President Am.

Soc. C. E., of Lowell; the late Mr. William J. MacAlpine, Past President Am. Soc. C. E., of New York, and Mr. Walter Shanly.

In connection with the city water supply, about the year 1860, Mr. Lesage made an exhaustive survey of the Laurentian range north of Montreal, visiting all the lakes that form a water shed of the North River, and returned fully assured that Montreal had a natural reservoir of purest water, available by the force of gravity alone. On the basis of this report, he was sent again into the Laurentian region, together with several well known engineers, who returned and reported his scheme as practicable, but it was afterwards considered somewhat too expensive, and another enlargement of the inland cut, the lower reservoir, and the construction of an upper reservoir were decided upon. This work was carried out under his supervision, together with the placing of additional pumping engines and turbines, giving Montreal one of the finest water works on the continent. One of Mr. Lesage's last recommendations, in which he was much interested, was that there should be still another enlargement, together with a settling basin, but he died before this work could be inaugurated.

Besides his work at Montreal, Mr. Lesage was employed as Consulting Engineer for the water works of Ottawa, London, Ont., Peterborough, Three Rivers, Sorel, St. Hyacinthe, and other Canadian municipalities.

Mr. Lesage married for his first wife Miss Eliza Harrington, daughter of Mr. Thomas Harrington; they had six children. The second wife, who was a Miss Dalbec, survives him, by whom he had sixteen children. Mr. Lesage was the father of twenty-two children. One of his daughters is a religieuse at St. Ann's; his eldest son, Mr. Thomas Lesage, is a civil engineer in the Water Works Department of Montreal; and another son, Joseph, is mechanical superintendent of the Canadian Pacific Railway.

Mr. Lesage became a member of the American Society of Civil Engineers, September 7th, 1881. From 1880 to 1883, he was Mayor of Verdun. He was also a prominent member of the Canadian Society of Civil Engineers.

Mr. Lesage was a man of much force of character and of great bravery, having rescued two people from drowning, one from the icy waters of the aqueduct in mid-winter, the other from the Lachine Rapids, for which deeds he was awarded the diploma and medal of Le Societé des Chevaliers Saveteurs des Alpes Maritimes. That he was highly esteemed by his acquaintances and contemporaries is evidenced by the resolutions of sympathy passed by the Montreal city officials at the time of his death, commemorating his "estimable qualities of disposition, his unwavering integrity, and the conscientious care and diligence he ever devoted to the duties of his important position."

ALBERT BRAINERD ROGERS, M. Am. Soc. C. E.*

DIED MAY 4TH, 1889.

Major A. B. Rogers was born at Orleans, Mass., May 28th, 1829. His parents removed to Maine in 1837, and in 1847 to Providence, R. I. He graduated from the Yale Scientific School in 1853, but remained as instructor in engineering, assistant to Professor Norton, until the spring of 1854. For the next two and a half years he was in the engineering department of New York State, employed on the enlargement of the Erie Canal. From this position he went to Iowa, and in 1858 to Waterville, Minn., where he engaged in trade.

Major Rogers married, in 1857, Miss Sarah Lawton, of New York, who died at Waterville in the following year.

In 1861 he took charge of the construction of the Iowa and Minnesota Division of the Chicago, Milwaukee and St. Paul Railroad, building from Rosemond to Austin, Minn., and from Calmar to Algona, Iowa, and from Mason City to Austin, also the Hastings and Dakota road. From 1863 to 1872 he was Resident and Assistant Engineer on the various lines now owned by the Chicago, Milwaukee and St. Paul Railway Company. In 1877, as Chief Engineer, he had charge of the building of the Minneapolis and St. Louis Railway to Albert Lea. From 1878–1880 he was Chief Engineer of the Hastings and Dakota Railway.

In 1881 Major Rogers commenced his explorations for the Rocky Mountain Division of the Canadian Pacific Railway, of which division he had charge until completed, he holding the last tie when the final spike was driven in 1885. The pass across the Selkirk Range of the Rocky Mountains, which he discovered, is called Rogers Pass in his honor. The following is an extract from the minutes of a meeting of the Board of Directors of the Canadian Pacific Railway, January 4th, 1884:

"The President stated that Major A. B. Rogers was now in Montreal, and that it was desirable to express the appreciation by this Company of his services in the location of the railway through the Rocky and Selkirk Mountains:

"Whereupon, it was

"*Resolved*, That in view of the valuable services which have been rendered to this Company by Major A. B. Rogers in the discovery of a practicable route through these mountains, and in the location of the line there, he be requested to accept the sum of $5 000 in testimony of the high appreciation by this Company of the successful performance of his arduous duties in that region."

* Committee to prepare memoir, Mr. Don J. Whittemore, Past President Am. Soc. C. E., and Mr. John Bogart, M. Am. Soc. C. E.

In 1886–87 he again engaged in explorations in Montana and Wyoming Territory, and it may be that he will be the only person who discovered two passes across the Rocky Mountains which will be occupied by transcontinental railways, making him really the railway pathfinder.

Major Rogers was among the first to assist in defending St. Peter against the Indians in 1862, and was appointed Major by Governor Ramsey.

He became a member of the American Society of Civil Engineers, July 12th, 1883, and was one of its most valued members.

Major Rogers was a man of the most estimable qualities, genial, frank and brave. Of gentlest manner but of great firmness and determination of character, his wide and varied experience and sympathy with his fellow-men made him a *raconteur* of rare quality. He was greatly beloved by all who knew him. He died at Waterville, May 4th, 1889, of cancer of the stomach, after a long illness fraught with suffering, which he had borne absolutely uncomplainingly and with cheerful submission, greatly regretted by a wide circle of friends who held him in the most tender regard.

CHARLES ALFRED MARSHALL, M. Am. Soc. C. E.

DIED MAY 31ST, 1889.

Charles A. Marshall was born at Camden, N. J., on February 3d, 1855. He received his early education at Wilmington, Del., until the fall of 1872, when he entered the University of Michigan, at Ann Arbor, Mich., graduating from that University in June, 1876. While an undergraduate he secured, by competitive examination, a position as Recorder in the United States Survey of the Northern and Northwestern lakes, spending the summers of 1874 and 1875 on this work.

Upon graduating from the University he entered the drafting office of the Edge Moor Iron Company, at Wilmington, Del, and in February, 1879, was placed in charge of that office as Chief Draughtsman and Designer, which position he retained until May, 1880. Afterwards he was an assistant for the late C. Shaler Smith, M. Am. Soc. C. E.; then was put in charge of drawings and inspection of five spans of the Sabula bridge over the Mississippi River, for the Chicago, Milwaukee and St. Paul Railway, with Don J. Whittemore, Past-President Am. Soc. C. E., Chief Engineer, and C. Shaler Smith, Consulting Engineer.

Upon the completion of this work he went with the Passaic Rolling Mill as Chief Engineer, but soon resigned this position and went to Johnstown, Pa., as assistant engineer in the employ of the Cambria

Iron Company. Mr. Marshall designed and had charge of the construction of several railway and highway bridges, besides the miscellaneous constructive work incidental to engineering practice, such as warehouses, roofs, mill extensions, etc. In November, 1883, he was made "Engineer of Tests" in charge of the Laboratory of Physical Tests of the Cambria Iron Company, retaining his oversight of the bridges of the Cambria Iron Company, which position he filled up to the time of his death.

Mr. Marshall became a Member of the American Society of Civil Engineers on October 9th, 1884.

When the disaster at Johnstown in May last, caused by the breaking of the South Fork dam, sent a thrill of horror over the world, Mr. Marshall's professional acquaintances and friends learned with deep regret that he was one of the thousands of victims swept away by that terrible calamity.

WILLIAM THAW, F. Am. Soc. C. E.*

DIED AUGUST 17TH, 1889.

By the death, at the City of Paris, on August 17th, 1889, of William Thaw, Fellow of this Society, there passed away in the prime of his usefulness a noble specimen of the type of man, who, without being a member of the profession, is such as the profession delights to honor. Mr. Thaw was identified with the transportation interests of this country in a remarkable manner, having engaged, when in his seventeenth year, in the forwarding business as a clerk, and in his twenty-second year having, in connection with Thomas S. Clarke, formed the firm of Clarke & Thaw, canal and steamboat owners and transporters, which firm continued in business until 1855. At the time of his death Mr. Thaw was the Second Vice-President of the Pennsylvania Company, controlling the Pennsylvania lines west of Pittsburgh, so that an active business life of almost fifty years was spent in developing the business transportation from a humble beginning on the Pennsylvania Canal to this magnificent fruition in the Pennsylvania Railroad as it is to-day.

William Thaw was born in Pittsburgh on October 12th, 1818, of parents who settled there in 1804. His father, John Thaw, came from Philadelphia as teller of a branch of the Bank of Pennsylvania, then just established in Pittsburgh. William was educated in the Western University of Pennsylvania, located at Pittsburgh. His first business occupation was as clerk in the United States Branch Bank in 1834. On February 9th, 1835, he engaged in the forwarding and commission business as a clerk with McKee, Clarke & Co. In 1840, as before stated, he

* Committee to prepare memoir, Mr. William P. Shinn, President Am. Soc. C. E.

joined in the formation of the firm of Clarke & Thaw. The Pennsylvania Canal was then one of the great avenues of connection between the East and the West. The canal and its connecting railroads, the Philadelphia and Columbia Railroad and the Portage Railroad, over the Alleghany Mountains, were owned by the State of Pennsylvania, while the boats and the horses used for towing them were owned by individuals or firms, of which the firm of Clarke & Thaw was one, their line being termed the "Pennsylvania and Ohio Line." At Pittsburgh the traffic was transferred to steamboats on the Ohio River, of which the new firm became possessed of a considerable number. Their business developed rapidly until after the opening of the Pennsylvania Railroad, which was completed as a through rail line by the opening of the mountain division on February 15th, 1854. The year 1855 saw Mr. Thaw, with others in a like position, with a difficult task on his hands, which was to dispose of his steamboat and canal boat interest with the least possible loss, the railroad line by that time having shown its ability to supplant the slower method of transportation. Mr. Thaw gave the year to the task, and succeeded in disposing of his transportation equipment, at a serious loss, however, and in 1856, in connection with Mr. Clarke, they undertook the conduct of the freight traffic of the Pennsylvania Railroad Company to all points west of Pittsburgh. At that time there were no cars running beyond the terminus of each individual line, and indeed there was a break of gauge at Pittsburgh, which made it impossible for the cars of the Pennsylvania Railroad Company to run on the lines west thereof; nor were the depots adjoining or in connection, on the contrary, all traffic had to be hauled a mile to make the transfer from one road to the other. The connection between the Pennsylvania Railroad and the Pittsburgh, Fort Wayne and Chicago Railroad was made in 1858. In 1864 Mr. Thaw joined with others connected with the Pennsylvania railroad system in organizing the "Star Union Line," which was the first line of cars built on a compromise gauge with broad tread wheels, adapting them to run through over the roads of both 4 feet 8½ inches and 4 feet 10 inches gauge. Mr. Thaw became the President of the Union Railroad and Transportation Company, the owner of this line, and continued as such until its equipment was sold to the Pennsylvania Company in 1873. The line proved a great success, and did more than any other agency perhaps, to develop the enormous through freight traffic of the Pennsylvania Railroad. In 1869 the Pennsylvania Railroad Company leased the Pittsburgh, Fort Wayne and Chicago Railway, thus extending its control through to Chicago, and in 1870 the Pennsylvania Company was organized as a subordinate corporation to the Pennsylvania Railroad Company, which transferred to the former the lease of the Fort Wayne Road and other lines connected therewith, and Mr. Thaw was made its Second Vice-President. He was also made Second Vice-President of the Pittsburgh, Cincinnati and St. Louis Railway

Company, controlling the Southwestern system of connecting lines as the Pennsylvania Company controlled the Northwestern system. These positions were held by Mr. Thaw at the time of his death.

It was a remarkable fact that within the space of less than half of Mr. Thaw's life he saw the rise, the success and the fall of the system of transportation used on the Pennsylvania Canal and Portage Railroad, a system which, when in the height of its usefulness, seemed to leave nothing more to be desired.

Mr. Thaw was a man of great public spirit, and he took an active interest in all movements to advance or likely to elevate his fellow men. His immense fortune was most worthily used in both public and private beneficence, but Mr. Thaw was a philanthropist at heart, and one who greatly preferred to bestow his gifts in such a manner that his left hand would not know what his right hand did. A remarkable trait in this branch of his character was testified to by a gentleman well known in Pittsburgh, to whom he stated on one occasion, in substance, that "There are plenty of persons to assist the worthy; I wish to look after the unworthy." His gifts to the Western University of Pennsylvania amounted to between three hundred and four hundred thousand dollars, while his charitable donations, from first to last, must have amounted to millions.

The expedition made to Mount Whitney in Southern California by Professor Langley, from which such admirable scientific results were obtained, was largely possible through the help of Mr. Thaw, who furnished the necessary and delicate apparatus for the expedition.

Mr. Thaw was twice married, and had a large family of children and grandchildren; six sons and four daughters were living at the time of his death, three of the sons and two of the daughters being married.

Mr. Thaw was a great reader, and was remarkably well informed upon a large range of subjects. He was also a good listener, and was always glad to receive information of value from any person, no matter how humble his position. Though impetuous in temperament and persistent in the assertion of his convictions, he was always willing to change his views when convinced they were wrong; but whoever assumed to set him right must be well prepared on the question for discussion, for Mr. Thaw had a rare command of facts and language, and always delivered himself with earnestness, his reasoning being based on his moral convictions of right and duty, and never on mere speculations, such as policy or expediency might suggest. In the social walks of life he was all that kindness could require or courtesy could expect, buoyant in disposition, mild and gentle in his intercourse with his fellow-men, and strictly upright in all his dealings. He was well entitled to the high rank which he had attained; his character in all its elements was beyond reproach and his reputation without a stain. His large benefactions, his sympathy for the sick and suffering and those whose calamities have

made their lives bitter and full of sorrow, and his constant efforts for the advancement of projects of a humane character have won for him the admiration and love of his fellow citizens. He has shown how wealth may be made to benefit the many, and in a plain, unassuming way has passed through life and will long be remembered for his good deeds.

Mr. Thaw became a Fellow of the American Society of Civil Engineers August 30, 1871, and he was also a subscriber to its building fund. He was interested in all branches of science, and particularly in those pertaining to the transportation interests, so that he was always willing to aid any project for the advancement of engineering or the interest of engineers.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
AYRES, HENRY WILCOX	Resident Engineer, City Water Works, Hartford, Conn	March 5, 1890
CLARK, GEORGE HUNTINGTON	Chief Engineer, East and West R. R. of Alabama, Cedartown, Ga	March 5, 1890
FORD, PORTER DWIGHT	Superintendent of Roadway, Long Island R. R., Long Island City, N. Y	March 5, 1890

JUNIORS.

INGALLS, OWEN LOVEJOY	Assistant Engineer, Sewerage Commission, 412 Second st., Washington, D. C	March 5, 1890
PARKER, CHARLES FRANCIS	Assistant Engineer, Suburban Rapid Transit Co., 843 East One Hundred and Sixty-fourth st., New York City	March 5, 1890
ROSS, ELMER WAYLAND	City Engineer's office, Providence, R. I	March 5, 1890
WOOD, IRVING SPARROW	City Engineer's office, Providence, R. I	March 5, 1890

CHANGES AND CORRECTIONS.

MEMBERS.

BEAHAN, WILLARD.....General Superintendent of Streets, City Hall, St. Louis, Mo.
CLARKE, H. WADSWORTH.....City Engineer, Syracuse, N. Y.
CONNOR, ADDISON.....Assistant Engineer, Department of Docks, Pier A. North River, New York City.
DARLINGTON, FRANK G.....Superintendent Eastern Div. Chicago, St. Louis and Pittsburgh R. R. Indianapolis, Ind.
DOANE, WALTER A.....Principal Assistant Engineer, Norfolk and Western R. R., Ceredo, W. Va.
DORAN, FRANK C.....813 Tenth st., Omaha, Neb.
EGGLESTON, T. C.....Care Panama R. R., Mills Building, New York City.
MILLER, SAMUEL H.....Kensington, Ohio.
MORRIS, GOUVERNEUR.....Johnson City, Tenn.
SKILTON, GEORGE S.....142 Park pl., Brooklyn, N. Y.
SMITH, MILLER A.....224 Keap st., Brooklyn, N. Y.

ASSOCIATE.

HUNSIKER, MILLARD.....Duquesne Club, Pittsburgh, Pa.

JUNIORS.

ELLSWORTH, ALFRED B.....Resident Engineer, Broad River Bridge, Georgia, Carolina and Northern Railway, Chester, S. C.
JOHNSON, SINCLAIR J.....(Care Am. Soc. C. E.), 127 East Twenty-third st., New York City.
MARVIN, CHARLES E.....Roadmaster Georgia Central R. R., Macon, Ga.
SHALER, IRA A.....Purdy Station, N. Y.
THOMSON, THOMAS KENNARD.....Bridge Engineer, Ohio Extension Norfolk and Western R. R., Ceredo, W. Va.
WADA, YOSICHIKA.....Chief Engineer Tiku-Ho Ry., Nogata Kurategun, Fukuoka-ken, Japan.
YOUNG, HERBERT A.....(Care E. H. Whorf, Assistant Manager Mexican Central R. R.), Mexico, Mexico.

ADDITIONS TO

LIBRARY AND MUSEUM.

From American Institute of Mining Engineers, Dr. R. W. Raymond, Secretary, New York City:

The Geology and Ore Deposits of Iron Hill, Leadville, Colorado. A. A. Blow.
Aluminum in Cast Iron. W. J. Keep.
The Wear of Rails as Related to their Section. P. H. Dudley.
The Geological Relations of the Principal Nova Scotia Minerals. E. Gilpin.
Note on the Form of Crater produced by Exploding Gunpowder in a Homogeneous Solid. Frank Firmstone.
Notes on the Geology of the Aspen Mining District. W. E. Newberry.
Notes on the Additional Diaphragen in the Howell Roasting Furnace. Charles W. Goodale.
The Ore Deposits of Red Mountain, Ouray County, Colorado. T. E. Schwarz.
Biographical Notes of William H. Scranton. R. W. Raymond.
The Distribution of Phosphorus in the Hudson River Carbonates. Ingersoll Olmstead.
The Iron Resources of Colorado. Prof. Regis Chauvenet.
Notes on the Republic of Colombia, S. A. John C. F. Randolph.
The Coal Trade and Miners' Wages in the United States for the Year 1888. Charles Albert Ashburner.
Proceedings of the Fifty-fifth Meeting, Ottawa, Ont., October, 1889.
Transactions, Vol. XVII—May, 1888, to February, 1889, inclusive.
The Influence of Silicon on the Determination of Phosphorus in Iron. Thomas M. Brown.
Discussion of Carpenter and Headdens' Note on the Influence of Columbite upon the Tin Assay. William P. Blake.

From Crawford Barlow, London:

The New Tay Bridge: a course of Lectures delivered at the Royal School of Military Engineering at Chatham, November, 1888. Crawford Barlow, London, 1888.

From Messrs. Bates and Kimball, Boston, Mass.:

Technology Architectural Review, Vol. II, No. 2 and 3, June and July, 1889.

From John S. Billings, Surgeon General U. S. A., Washington, D. C.:

Index Catalogue of The Library of The Surgeon General's Office, United States Army, Vol. X.

From Hon. John Bogart, New York City:

Annual Report of the State Engineer and Surveyor for the Fiscal Year ending Sept. 30th, 1888, with Maps.

From Bureau of Navigation, Navy Department, Washington, D. C.:

General Information Series, No. VIII.
Naval Mobilization and Improvement in Material, June, 1889.
Pilot Chart of the North Atlantic Ocean for September, October, November and December, 1889, and Supplement, showing the St. Thomas-Hatteras Hurricane of September 3-12, 1889.

From Bureau of Pensions, Washington, D. C.:

Annual Report of the Commissioner of Pensions for 1889.

From Bureau of Statistics, Washington, D. C.:

Reports from the Consuls of the United States, May, July, August and September, 1889.

From Bureau of Statistics of Labor, Boston, Mass.:

Census of Massachusetts for the Year 1875:
Vol. II, Manufactures and Occupation.
Vol. IV, Compendium.
Census for the year 1885:
Vol. I, Parts I and II, Population and Social Statistics.
Vol. II, Manufactures, The Fisheries and Commerce.
Vol. III, Agricultural Products and Property.
Third Annual Report of the Bureau of Statistics of Labor, embracing the Account of its Operations and Inquiries from March 1, 1871, to March 1, 1872.
Eighteenth and Nineteenth Annual Report for the years 1887 and 1888.
First Annual Report of the Statistics of Manufacturers, 1886 and 1887.
Reports of Fall River, Lowell and Lawrence. Carroll D. Wright, Boston, 1882.
Sunday Labor. Carroll D. Wright, Boston, 1885.
Health Statistics of Female College Graduates. Carroll D. Wright, Boston, 1885.
Memorial of Henry K. Oliver. Rev. Jesse H. Jones, Boston, 1885.
Profit Sharing. Carroll D. Wright, Boston, 1886.
Food Consumption, Quantities, Costs and Nutrients of Food Material. Carroll D. Wright, Boston, 1886.
Art in Industry. Carroll D. Wright, Boston, 1886.
Industrial Conciliation and Arbitration. Carroll D. Wright, Boston, 1881.
A Manual of Distribution Co-operation. Carroll D. Wright, Boston, 1885.
Proceedings of the Fourth Annual Session of the National Convention of Chiefs and Commissioners of the various Bureaus of Statistics of Labor in the United States, held at Trenton, N.J., June 1, 2 and 3, 1886.
Uniform Hours of Labor. Carroll D. Wright, Boston, 1889.
Employers' Liability for Personal Injuries to their Employees. Charles G. Fall, Boston, 1889.
Early Factory Labor in New England. Harriet H. Robinson, Boston, 1889.

From Gen. Thomas Lincoln Casey, Chief of Engineers, U. S. A., Washington, D. C.:

Advertisements, Specifications and Proposals as follows:
Of the Mississippi River Commission Towboat "Minnetonka."
Of the Mississippi River Commission Towboat and Inspection Steamer "Mississippi."

For Building an Aqueduct Bridge over Rock Creek at Washington, D. C., for Water Supply, District of Columbia.
For Construction of a Sewerage System at Fort Monroe, Va.
For Improving New York Harbor, N. Y.
For Construction of Brush Dykes in James River, Va.
For Improving Saline River, Louisiana and Texas, above Orange, Texas.
For Paving Levee at Shawneetown, Ill.
For Removal of Wreck in Newburyport Harbor, Mass.
For Lengthening and Repairing Steam Launch "Sand Beach," belonging to the Harbor of Refuge, Lake Huron.
For Removing, Repairing and Constructing Wing Dams and Shore Protection in the Savannah River, below Augusta, Ga.
For Improving the Channel of Passaic River, New Jersey.
For Iron Pier at Portsmouth, Ohio.
For Repairing Jetty at the Mouth of Christiana River, Wilmington Harbor, Delaware.
For Construction of the Abutment for Dam No. 1, Cumberland River.
For Removal of Wreck in Delaware Breakwater Harbor, Delaware.
For Constructing Revetment and for Dredging at Clinton River, Michigan.
For Improving Cunituck Sound, N. C.

From B. D. McConnell, Montreal, Canada:
Annual Report of the Superintendent of the Montreal Water Works for the Year ending 31st December, 1888.

From Professor George H. Cooke, State Geologist, New Brunswick, N. J.:
Geological Map of New Jersey, from Original Surveys.

From Department of Agriculture, Washington, D. C.:
Album of Agricultural Statistics of the United States, 1889.
Report of the Commissioner of Agriculture for the year 1888.

From Department of State, Washington, D. C.:
Trade and Transportation between the United States and Spanish America, William Ellery Curtis, Washington, 1889.

From A. D. Foote, Boise City, Idaho:
Report of the Governor of Idaho to the Secretary of the Interior, 1889.

From M. N. Forney, New York City:
Report of the Proceedings of the Twenty-third Annual Convention of the Master Car Builders' Association, held at Saratoga, N. Y., June 25th, 26th and 27th, 1889.

From Free Public Library, San Francisco, California:
Report of the Board of Trustees of the San Francisco Free Public Library for the Fiscal Year ending June 30th, 1889.

From Professor E. A. Fuertes, Ithaca, N. Y.:
Bulletin of the Agricultural Experiment Station of Cornell University College of Agriculture, for September to December inclusive, 1889.

From E. Sherman Gould, Scranton, Pa.:
Practical Hydraulic Formulas for the Distribution of Water through Long Pipes. E. Sherman Gould, New York, 1889.

From General A. W. Greely, Chief Signal Officer U. S. A., Washington, D. C.:
United States Signal Service Monthly Weather Review for June to September, inclusive, 1889.

From Capt. F. V. Greene, New York City:
Asphalt and its uses, F. V. Greene, New York, 1889.

From J. F. Halloway, Cleveland, Ohio:
Pumping Machinery, Ancient and Modern.

From William Hamilton, Toronto, Canada:
Annual Report of the Superintendent of the Toronto Water Works for the year ending 31st December, 1888.

From Leveson, Francis Vernon Harcourt, London:
De la Canalisation des Riveres et des Rivers Systèmes de Barrages Mobiles. Francis Vernon Harcourt, Paris, 1889.

From J. B. Henderson, Brisbane, Queensland, Australia:
Map of Queensland Water Supply Department Artesian Bores.
Reports of the Mining Registrars for the quarter ending June 30th, 1889.
Report of the Secretary of Mines on the Mineral Statistics of Victoria for the year 1888.

From A. W. Howitt, Acting Secretary for Mines, Melbourne, Victoria, Australia:
Annual Report of the Secretary of Mines on the Working of the Regulation and Inspection of Mines and Mining Machinery Act, during the year 1888.

From William A. Ingham, Secretary Board of Commissioners, Second Geological Survey of Pennsylvania:
A Directory of the Fossils of Pennsylvania and Neighboring States named in the Reports and Catalogues of the Survey.
Annual Report of the Geological Survey of Pennsylvania for 1887.
South Mountain Map Sheets.

From Institution of Civil Engineers, James Forrest, Secretary, London:
The Treatment of Steel by Hydraulic Pressure. William Henry Greenwood, with an abstract of the discussion upon the paper.
Armor for Ships. Sir Nathaniel Barnaby, with an abstract of the discussion upon the paper.
Heat Expenditure in Steam Engines, comprising the following papers:
I. Experiments on a Steam Engine the Cylinder of which was heated externally by Gas Flames. Bryan Dunkin.
II. Investigation of the Heat Expenditure in Steam Engines, especially with reference to Methods of Diminishing Cylinder Condensation. Prof. Dudshauvers Dery.
Water Supply of Italian Towns. Alexander Fairlie Bruce.
Underpinning Great Yarmouth Town Hall. Frederick Eliot Duckham.
Foundations of Daly College, Indere. David Michael Litster.
On the New Steel Dock Gates of Limerick Floating Dock. William Jeremiah Hall.
Experiments on the Movements of Sewer Air at Wimbledon, 1888. William Sante Crimp.
The Removal of Rock Under Water without Explosives. Frederick Lobnitz.

Perforated Cake Powder for Ordnance. George Quick.
Water Softening and Filtering Apparatus for Locomotive Purposes at the Taff Vale Railway Company, Penarth Dock Station, near Cardiff. William Wade Fitzherbert Pullen.
West of India Portuguese Railway and Harbour Works. Ernest Edward Sawyer.
The Cyclical Velocity Variations of Steam and other Engines. Herbert Byron Ransom.
Experiments on the Strain in the outer layers of Cast-Iron and Steel Beams. Edward Carstensen de Segunde.
On the New Programme for Ship Building. W. H. White.
The Bore of the Trien Tang Kiang. W. Osborne Moore.
The Improvement of the River Avon below Bristol. William Chatham.
Charter, Supplemental Charter, By-Laws and List of Members.
Minutes of Proceedings, Vol. XCVII. and XCVIII.
Brief Subject Index, Vol. LIX to XCVIII. Sessions 1879-80 to 1888-89.

From The Institution of Engineers and Shipbuilders in Scotland, W. J. Millar, Secretary, Glasgow, Scotland:

Transactions, Vol. XXXII., 1888-89.

From Iowa State Board of Health, J. F. Kennedy, Secretary, Des Moines, Iowa:

Monthly Bulletin Iowa State Board of Health, September and October, 1889.
Fifth Biennial Report of the Board of Health of the State of Iowa for the Fiscal Period ending June 30th, 1889.

From Iron and Steel Institute, J. S. Jeans, Secretary, London:

The Journal of the Iron and Steel Institute, No. 1, 1889.

From William Jackson, Boston, Mass.:

Contract and Specifications for Improved Sewerage for the City of Boston, Mass.
Contract and Specifications for Curb Stones for the City of Boston, August, 1889.
Specifications and Contract for Widening the Opening for the Passage of Vessels through Granite Bridge for the City of Boston and the Town of Milton, September, 1889.
Contract and Specifications for Water Pipe Box at Warren Bridge, South Side.
Contract and Specifications for Two Siphons for Water Pipes at Warren Bridge.
Contract and Specifications for Filling at Marine Park, for the Park Department of the City of Boston, August, 1889.
Contract and Specifications for Water Pipe Box at Warren Bridge, North Side.

From M. R. Jefferds, London, England:

How to Decrease Railway Rates and Increase Dividends thereby.

From Wm. Alger Jefferis, New York City:

Ten Photographs of Views on the Colorodo Central Railroad
Photographs of Views in the Garden of the Gods, Manitou Springs, Colorado, Denver and Rio Grande Railroad.

From Walter Katté, New York City:

The Civil Engineer and Architect's Journal, Vol. I to XV, 1837 to 1852, and Vol. XXI to XXV, 1858 to 1862, inclusive.
The American Railroad Journal, Vol. XV, 1859.

From Louis H. Knap, Buffalo, N. Y.:

Twentieth Annual Report of the Buffalo City Water Works, Buffalo, New York, for the year 1888.

From Emil Kuichling, Rochester, N. Y.:

Review by Emil Kuichling, C. E., of the Plans and Estimates of the Salmon River as a Source of Water Supply, as reported by C. H. Bogardus to the Syracuse and Salmon River Water Company, March, 1888, and by J. J. R. Croes, as reported to the Syracuse Water Commission, February 1, 1889.

From G. Leverich, Brooklyn, N. Y.:

Notes and Comments on the Failure of the Bridge on the Lake Shore and Michigan Southern Railway near Ahstabula Creek, December 30th, 1876.

From Casswell McClellan, St. Paul, Minnesota:

Notes on the Personal Memoirs of P. H. Sheridan. Casswell McClellan, St. Paul, 1889.

From Maj. O. E. Michaelis, Corps of Ordnance, U. S. A., Augusta, Maine:

The Army of Kukuanaland.

From George S. Morison, Chicago, Illinois:

Paper on Bridges, read before St. Louis Commercial Club, by George S. Morison, March 16th, 1889.

From Gilbert Murdoch, St. John, N. B., Canada:

Annual Accounts and Statements, with Superintendent's and Auditor's Reports of Sewerage and Water Supply for the City of Saint John (East side) and Town of Portland, for the year ending December 31st, 1888.

From Henry B. Murray, New York City:

The Pelton Water Wheel.

From M. Nally, Chief Engineer of Water Supply, Melbourne, Victoria, Australia:

Victorian Water Supply River Gaugings for 1889.
Proposed East Goulburn Irrigation and Water Supply, Melbourne, 1889.
Proposed Lerderberg Irrigation and Water Supply Trust, Melbourne, 1889.

THE NORMAN MEDAL.

CODE OF RULES FOR ITS AWARD.

I.—Competition for the Norman Medal of the American Society of Civil Engineers shall be restricted to Members of the Society.

II.—There shall be one gold medal, and only one, struck for each and every fiscal year of the Society, and awarded as hereinafter provided. The dies therefor shall be with the Superintendent of the United States Mint at Philadelphia, in trust exclusively for the above purpose. Such medal shall be of a cost equal to the annual interest received upon $1 000 of the Consolidated Stock of the City of New York, Certificate No. 179, of the additional new Croton Aqueduct Stock of the City of New York, authorized by an Act of the Legislature of the State of New York, Chap. 230, passed April 15th, 1870, dated November 17th, 1873, now held in trust by the Treasurer of this Society, and so held solely for this purpose, and shall be executed upon his order.

III.—All original papers presented to the Society by Members of any class, during the year for which the medal is awarded, shall be open to the award, provided that such papers shall not have been previously contributed in whole or in part to any other association, nor have appeared in print prior to their publication by the Society, nor have been presented to the Society in any previous year.

IV.—The Board of Censors to award the medal shall consist of three Members of the Society, to be designated by the Board of Direction. The Secretary of the Society shall act as Secretary to the Board of Censors.

V.—The medal shall be awarded to such paper as the said Board shall judge to be worthy of special commendation for its merits as a contribution to engineering science, not merely relatively as compared with others presented during the same year, but as exhibiting the science, talent or industry displayed in the consideration of the subject treated of, and for the good which may be expected to result from the discussion and the inquiry.

VI.—In case no paper presented during the year shall be deemed of sufficient value to receive an award, the amount of the interest of the fund for that year shall be expended by the Board of Direction in the purchase of books, to be offered as a premium for the second best paper in the next year in which more than one paper of sufficient value may be presented.

VII.—The medal year shall terminate on the first day of August, and the award shall be announced at the annual meeting.

VIII.—The Treasurer of this Society shall cause the medal to be prepared and delivered to, or deposited to the order of, the successful competitor, within two months after the annual meeting at which the same shall have been awarded.

ERRATA.

Proceedings, Am. Soc. C. E., June, 1890, page 123. Fourth Session, Friday, June 27th, Afternoon. Insert: A paper on "The River Spans of the Cincinnati and Covington Elevated Railway Transfer and Bridge Company," by William H. Burr, M. Am. Soc. C. E., was presented by the author and discussed by Messrs. Osborn, J. B. Johnson, Strobel and Burr.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XVI.—May—June—July, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

MAY 7TH, 1890.—The Society met at 20 o'clock, President William P. Shinn in the chair; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As Members: Holland Williams Baker, St. Louis, Mo.; Henry Hall Carter, Boston, Mass.; Henry Augustus Herrick, Spokane Falls, Wash.; Edward Clarence Jordan, Portland, Me.; Gustave Kaufman, Allegheny, Pa.; John Patrick Kelly, Troy, N. Y.; Albert Bruce Knight, Butte City, Montana; Olin Daniel Leisenring, Cleveland, O.; Otto Julius Marstrand, Brooklyn, N. Y.; Albert Stanley Riffle, Walla Walla, Wash.; Charles Wilkinson Staniford, New York City. As Associate: Malvern Abijah Howe, Terre Haute, Ind. As Juniors: George Goodell Earl, Montgomery, Ala.; Charles Evan Fowler, Muncie, Ind.; William James Stewart, Rochester, N. Y.; Arthur Cornwallis Wheatley, Chiapas, Mex.; Henry Clay Yeatman, Chiapas, Mex.; Albert Henry Zeller, St. Louis, Mo.

The death, on May 1st, 1890, of Major O. E. Michaelis, M. Am. Soc. C. E., Corps of Ordnance, U. S. A., was announced.

A paper by Arthur S. C. Würtele, M. Am. Soc. C. E., on "The Stability of Loaded Arches," was presented and the general subject was discussed by Messrs. Fteley, Brush, Hardy, James Owen, Shinn, Cohen, John Bogart, Skinner and Norton.

MAY 21ST, 1890.—The Society met at 20 o'clock, Director Charles B. Brush in the chair; John Bogart, Secretary.

The death, on May 19th, 1890, of Mr. Frank A. Leers, M. Am. Soc. C. E., was announced.

Mr. F. Collingwood, M. Am. Soc. C. E., presented a short discussion on Cements, and the subject was discussed by Messrs. Gould, Brush, Seaman, C. J. Bates, Worthen, Crowell, Brendlinger, Buck, Skinner, John Bogart, Balston and Collingwood.

MEMOIRS OF DECEASED MEMBERS.

JAMES HENRY MORLEY, M. Am. Soc. C. E.*

DIED SEPTEMBER 8TH, 1889.

James Henry Morley was born in Westfield, Mass., May 5th, 1824. His school training was received at the academy of his native town and at the Massachusetts Normal School, also located in Westfield.

After leaving school he spent one year (1845–46) in Springfield, Mass., as a student in engineering with Adna Anderson, afterwards well-known as Chief Engineer of the Northern Pacific Railway, and lately deceased. His first engagement in engineering was on the Connecticut River Railroad in the spring of 1846, when twenty-two years of age. In the autumn of the same year he joined the Engineer Corps of the New York and Erie Railroad, then under construction. During his service on this road he was an assistant under Mr. James P. Kirkwood on the Starrucca viaduct, a series of masonry arches 1 200 feet long with a maximum height of 110 feet, and at the time the greatest work of its kind in the United States.

Upon the completion of the Erie Railroad he came, in April, 1851, to Missouri with Mr. Kirkwood, who had recently been appointed Chief Engineer of the Pacific Railroad. After two years spent on this road in surveys and construction, he was, in 1853, at the age of twenty-nine, appointed Chief Engineer of the Iron Mountain Railroad, which, during the next three years, he located and built from St. Louis to Pilot Knob, a distance of 86 miles, where for a number of years the road ended. While employed in this work he was, on October 1st, 1855, married, in Windsor, N. Y., to Miss Virginia F. Woodruff, who survives him.

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* Committee to prepare memoir, Col. Henry Flad, Past President Am. Soc. C. E., Mr. Robert Moore, M. Am. Soc. C. E., and Mr. Decatur Axtell, M. Am. Soc. C. E.

After the completion of the Iron Mountain road he took a position, in July, 1857, on the Croton Water Works, and was employed for about a year in making surveys in Westchester County, N. Y., for the location of a storage reservoir. Upon completion of this work he returned to St. Louis and was engaged as engineer on the Terra Haute, Alton and St. Louis Railroad. A change of administration, in 1859, led to his resignation and removal to Pacific, Franklin County, Mo., on the line of the Pacific Railroad. From here, in May, 1862, he went to Montana, where he was engaged in the planning and execution of engineering works in connection with various mining enterprises.

In 1865 Mr. Morley was recalled to the Iron Mountain Railroad, at first as Chief Engineer and then as Superintendent. In 1889 he completed the extension of this road to Belmont, on the Mississippi River, opposite Columbus, Ky., a distance of 120 miles. Subsequently he located and built the southern extension of the same railroad to the south boundary of Missouri and across the State of Arkansas to the northern boundary of Texas, at Texarkana, 404 miles from Pilot Knob and 490 miles from St. Louis.

After the completion of these lines he remained in the position of Chief Engineer until the purchase of the Iron Mountain Road by the Missouri Pacific Railroad Company in 1883.

After leaving the service of the Iron Mountain road until his death, September 8th, 1889, he was never actively engaged in professional work, though for several years he was president of the Mary Murphy Mining Company of Colorado.

Mr. Morley was an engineer of fine ability, possessing to a very high degree the "topographical sense" so necessary to the locating engineer. By those who were in a position to know and judge of his work, the lines built by him are believed to be faultless in location, except in a few cases where his judgment was overruled by others.

His character matched well with his ability. A man of the utmost truth and simplicity of character, he possessed the unbounded confidence and esteem of all who knew him. To his assistants he was like a father, and to all of them his death was a personal bereavement.

He leaves no children, his only daughter having died in 1870.

WILLIAM M. LYON, F. AM. SOC. C. E.*

DIED JULY 3D, 1889.

The death of William M. Lyon, at the age of eighty, cannot be said to have been premature, and yet his was one of those broad, sympathetic natures which never seem to grow old, and no one who had the opportunity to enjoy personal contact with him, during his later years, could think of him as one who had passed the span of life ordinarily allotted to man. Largely endowed by nature, both intellectually and physically, his presence was always felt and his influence was always exerted for good objects and large ideas. The history of the rise and progress of the manufacture of iron in Western Pennsylvania would include the business life of Mr. Lyon for quite half a century. The nobleness of his character endeared him to a wide circle of friends, to not a few of whom he was indeed a counsellor, guide and friend. His large nature made him an example among men, but in his makeup there was no trait that equaled his modesty. His mind was a fountain of learning and wisdom, and there was no good cause that would profit his fellows that did not have his prompt, active sympathy.

William M. Lyon was born at Harrisburg, Pa., on the 30th day of April, 1809. He was the oldest son of John Lyon, the founder of the great iron firm of Lyon, Shorb & Co., and his mother was a daughter of Hon. William McClay, one of the first United States Senators from Pennsylvania.

Mr. Lyon received his education partly in Dickinson College at Carlisle, Pa., and partly in Union College at Schenectady, N. Y. He spent two years in the study of law at Uniontown, Pa., but did not seek admission to the bar.

In 1831 his father bought the interest of the Barnetts in the iron making firm of Barnetts & Shorb, and formed the firm of Lyon, Shorb & Co. Of this firm, William M. Lyon became a member, and though the youngest, soon gave evidence of possessing those qualities by which he was subsequently distinguished.

The great firm of Lyon, Shorb & Co. had furnaces, forges and mills on both sides of the Allegheny range, with its representatives in Cincinnati, St. Louis and other cities, and was known everywhere for the excellence of its products. During the last twenty years of its existence Mr. Lyon was its directing and controlling manager, and he retained his interest until the affairs of the firm were wound up.

* Committee to prepare memoir, Mr. William P. Shinn, President Am. Soc. C. E.

Mr. Lyon was remarkable for the tenacity of his memory. Whatever he had read he seemed to be able to recall without effort. His range of reading was unusually great, so that within the lapse of half an hour one might hear him state the complicated statistics of an industrial experiment, give the ascertained area of a Central African Lake and recite pertinent passages from Shakespeare, Hudibras or Burns.

Science—and especially the science involved in the manufacture of iron and steel, were subjects in which he retained his interest to the last.

He was no lover of money, valuing it only as an instrument to be used for higher purposes,

Mr. Lyon never married; but he showed no trace of what are sometimes stigmatized as the characteristic traits of an old bachelor.

He was no pessimist in any direction, but was a true lover of his kind, and verily rejoiced in every sign or indication of whatever movement might tend to the elevation of man's estate.

Mr. Lyon died on the morning of July 3d, 1889. His death was like his life, quiet, peaceful and devoid of painful experiences.

Thus passed away a man who, for genuineness of character, for noble ends and fidelity of friendship, was the peer of any. He will be long remembered in the community in which most of his life was spent as a man whom all respected, and by those to whom he was personally known he is mourned as near and dear friends are mourned.

Mr. Lyon became a Fellow of the Society March 23d, 1870.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BAKER, HOLLAND WILLIAMS	2732 Pine st., St. Louis, Mo.	May 7, 1890
CARTER, HENRY HALL	2A Bacon st., Boston, Mass.	May 7, 1890
DAVISON, GEORGE STEWART	90 Westinghouse Bldg. Pittsburgh, Pa.	April 2, 1890
HAINS, PETER CONOVER	Lt.-Col. Corps of Engineers, U. S. A., Washington, D. C.	April 2, 1890
HATCH, FREDERICK THOMAS	Engineer Maintenance of Way, Chicago, St. Louis and Pittsburgh Ry., Indianapolis, Ind.	Dec. 4. 1889
HERRICK, HENRY AUGUSTUS	Resident Engineer Washington Water Power Co., Spokane Falls, Wash.	May 7, 1890
JORDAN, EDWARD CLARENCE	184 Middle st., Portland, Me.	May 7, 1890
KAUFMAN, GUSTAVE	813 Hamilton Bldg., Pittsburgh, Pa.	May 7, 1890

KELLY, JOHN PATRICK	Resident Engineer Eastern Div. N. Y. State Canal, 249 8th st., Troy, N. Y.	May 7, 1890
KNIGHT, ALBERT BRUCE	P. O. Box 211, Butte, Mont	May 7, 1890
MARSTRAND, OTTO JULIUS	Assistant Engineer Union Elevated R. R., 31 Sands st., Brooklyn, N. Y.	May 7, 1890
MCDONALD, JOHN ALEXANDER	Engineer Road and Bridge Dept., Sydney, N. S. W., Australia	Feb. 5, 1890
MCCANN, THOMAS HENRY	Beyer & McCann, Hoboken, N.J.	April 2, 1890
MCMINN, THOMAS JAMES	277 Pearl st., New York City	March 5, 1890
RAMSEY, JOSEPH, Jr	Assistant to President C. C. C. & St. L. Ry., Cincinnati, O.	May 1, 1889
STANIFORD, CHARLES WILKINSON	Assistant Surveyor Dept. of Docks, Pier A, North River, New York City	May 7, 1890
THOMPSON, GAYLORD	355 Warburton ave., Yonkers, N. Y.	April 2, 1890
VAN AUKEN, ALVA MORGAN	Chief Engineer Belmont and Froid Canal, Julesburg, Colo.	Oct. 2, 1889
WALLACE, JOHN HERBERT	Assistant Supt. Track Southern Pacific Co., San Francisco, Cal.	Jan. 2, 1890
WARREN, WILLIAM HENRY	University of Sydney, N. S. W., Australia	Feb. 5, 1890
WILSON, HERBERT MICHAEL	Engineer Irrigation Section U. S. Geological Survey, Washington, D. C.	J. Sep. 5, 1883 M. Jan. 2, 1890

ASSOCIATE.

POMEROY, LEWIS ROBERTS	45 Broadway, New York City	April 2, 1890

JUNIORS.

BLODGETT, JOHN	Pencoyd Bridge and Construction Co., Pencoyd, Pa.	Dec. 4, 1889
CREUZBAUR, ROBERT WALTER	213 Stewart Bldg., New York City	April 2, 1890
EARL, GEORGE GOODELL	City Engineer, Americus, Ga.	May 7, 1890
FOWLER, CHARLES EVAN	Indiana Bridge Co., Muncie, Ind.	May 7, 1890
MCMEEKIN, CHARLES WILLIAM	Des Moines, Iowa	April 2, 1890
PURSLOW, ERNEST JOHN	Santa Barbara, Cal.	March 5, 1890
SPEIDEL, HUGO S	Riverside Bridge and Iron Works, Paterson, N. J.	Feb. 5, 1890
STEWART, WILLIAM JAMES	City Surveyor's Office, Rochester, N. Y.	May 7, 1890
ZELLER, ALBERT HENRY	1800 2d Carondelet ave., St. Louis, Mo.	May 7, 1890

CHANGES AND CORRECTIONS.

MEMBERS.

ALBERT, S. THAYER.....U. S. Agent, 1928½ Penna. ave, Washington, D. C.

AXTELL, DECATUR.....Assistant to President Chesapeake & Ohio Ry., Richmond, Va.

BARLOW, JOHN Q.....Division Engineer Union Pacific Ry., Milford, Utah.

BATES, CHARLES J.....63 Broadway, New York City.

BLAKE, EDWARD J.....Chief Engineer Chicago, Burlington and Quincy R. R., Chicago, Ill.

BONTECOU, DANIEL.....Chief Engineer Kansas City, Ft. Scott and Memphis R. R., Kansas City, Mo.

BONZANO, M. F.....Assistant General Superintendent Philadelphia and Reading R. R., 227 South 4th st., Philadelphia, Pa.

BRACKENRIDGE, WILLIAM A.....Toms River, Ocean Co., N. J.

BRECKENRIDGE, CABELL.....Erlanger, Ky.

BREEN, HOWARD.....Major Block, Room 75, Chicago, Ill

BREITHAUPT, W. H.....Berlin, Ontario, Canada.

BRODHEAD, C. E.....Caledonia, Lexington Co., N. Y.

BUSH, H. D.....American Plaster Board Co., 52 Broad st., New York City.

CARPENTER, C. A.....Principal Assistant Engineer Bridges and Buildings, C. M. and St. P. Ry., Tomah, Wis.

CHURCH, CHARLES T.....Geneva, N. Y.

CROWELL, J. FOSTER.....59 Wall st, Room 6, New York City.

DAVIS, FRANK P.....Division Engineer Nicaragua Canal Construction Co., San Juan del Norte, Nicaragua.

ENDICOTT, M. T.....Civil Engineer U. S. N., Bureau of Yards and Docks, Navy Dept., Washington, D. C.

EVANS, L. P.....Cofrode and Evans, cor. 4th and Walnut sts., Philadelphia, Pa.

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FLAGG, J. FOSTER.....(Care Am. Soc. C. E.), 127 E. 23d st., New York City.

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GIBBS, C. W.....Chief Engineer Rio Grande Southern R. R., Dallas, Col.

GOAD, CHARLES E.....185 St. James st., Montreal, Canada.

GREENE, B. D.....50 Broadway, New York City.

HARDY, GEORGE R.....Times Bldg., New York City.

HARLOWE, CHARLES.....(Care Northern Pacific R. R.), Centralia, Wash.

KELLY, JOHN PATRICK	Resident Engineer Eastern Div. N. Y. State Canal, 249 8th st., Troy, N. Y.	May 7, 1890
KNIGHT, ALBERT BRUCE	P. O. Box 211, Butte, Mont.	May 7, 1890
MARSTRAND, OTTO JULIUS	Assistant Engineer Union Elevated R. R., 31 Sands st., Brooklyn, N. Y.	May 7, 1890
MCDONALD, JOHN ALEXANDER	Engineer Road and Bridge Dept., Sydney, N. S. W., Australia	Feb. 5, 1890
MCCANN, THOMAS HENRY	Beyer & McCann, Hoboken, N.J.	April 2, 1890
MCMINN, THOMAS JAMES	277 Pearl st., New York City	March 5, 1890
RAMSEY, JOSEPH, Jr	Assistant to President C. C. C. & St. L. Ry., Cincinnati, O.	May 1, 1889
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HARDY, GEORGE R.....Times Bldg., New York City.

HARLOWE, CHARLES.....(Care Northern Pacific R. R.), Centralia, Wash.

HARRIS, ROBERT L.....195 Washington Bldg., 1 Broadway, New York City.
HEGEMAN, W. W.....40 Wall st., New York City.
HOFF, OLAF.....602 Oneida Block, Minneapolis, Minn.
HOOVER, J. W.....837 New York Life Bldg., Kansas City, Mo.
HUNT, RANDELL.....130 Sansome st., San Francisco, Cal.
JACKSON, L. B.....Chief Engineer Chesapeake and Ohio Ry., Cincinnati, Ohio.
JAMIESON, J. Q.....Assistant Engineer Union Pacific Ry., Portland, Oregon.
JENKINS, W. D.....Chief Engineer New Orleans and North Western Ry., Natchez, Miss.
JENNINGS, W. H.....Chief Engineer Hocking and Western R. R., Circleville, Ohio.
JENNINGS, WILLIAM T.....City Engineer, Toronto, Canada.
JUENGST, HENRY F.....(Care City Water Co.), East St. Louis, Mo.
LANDRETH, WILLIAM B.....20 Gillespie St., Schenectady, N. Y.
LEWIS, SIDNEY F.....State Engineer, Room 2, Cotton Exchange, New Orleans, La.
LONG, THOMAS J.....(Care Union Bridge Co.), 68 Laclede Bldg., St. Louis, Mo.
LOREE, L. F.....Superintendent Cleveland and Pittsburgh R. R., Wellsville, Ohio.
MACFARLANE, JAMES.....Chief Engineer Montana Mining Co., Butte, Mont.
MACLEOD, JOHN.....Consulting Engineer, 1603 Fourth ave., Louisville, Ky.
MAGUIRE, EDWARD.....Capt. Corps of Engineers, U. S. A., P. O. Drawer 99, Louisville, Ky.
MCCOOL, DANIEL.....(Care C. L. W. Eidlitz), 128 Broadway, New York City.
MCDOWELL, N. M.....4223 Fifth avenue, Pittsburgh, Pa.
MILLER, H. I.....Superintendent Jeffersonville, Madison and Indianapolis R. R., Louisville, Ky.
MILLER, J. IMBRIE.....507 Sweede St., Norristown, Pa.
MONROE, J. ALBERT.....Providence, R. I.
MORRIS, T. O.....Assistant Chief Engineer Cleveland, Cincinnati, Chicago and St. Louis Ry., Indianapolis, Ind.
MORSE, CHARLES J.....1107 The Rookery, Chicago, Ill.
NEARING, FRANK.....Norristown, Pa.
NORMAN, GEORGE H.....Newport, R. I.
PAINE, A. B.....Windsor Hotel, New York City.
PARENT, E. H.....Box 2031 Montreal, Canada.
PARET, M. P.....U. S. Assistant Engineer, Fernandina, Fla.
PARKER, A. MCC.....Assistant Engineer Dept. of Docks, foot of East 16th st, New York City.
RICE, L. FRED.....4 Pemberton sq., Boston, Mass.

RICHARDSON, B. FRANK.....Assistant Engineer Baltimore and Ohio R. R., 2030 Federal st., Philadelphia, Pa.
ROBINSON, A. A.....Topeka, Kansas.
RUDLOFF, HENRY F.....Chief Section 1, Gran Ferrocarril de Venezuela, Caracas, Venezuela.
SANDERSON, J. GARDNER.....5 Dey st., New York City.
SAVAGE, A. C.....61 Broadway, Room 26, New York City.
SCHMIDT, MAX E.....Civil Engineer and Contractor, 1127 The Rookery, Chicago, Ill.
SCHERZER, A. J.....(Care W. H. Harned), 330 Drexel Bldg, Philadelphia, Pa.
SEWALL, JOSEPH S.....46 Gilfillan Block, St. Paul, Minn.
SMITH, JOSEPH S.....(Care La Montagne, Clarke & Co.), 44 Broadway, New York City.
SONNE, O.....Engineer Cardiff Coal and Iron Co., Cardiff, Tenn.
SPENCER, SAMUEL.....23 Wall st., New York City.
THACKRAY, GEORGE E.....Office of Chief Engineer Cambria Iron Co., Johnstown, Pa.
VANCE, HART.....Winchester, Ky.
WAGNER, SAMUEL TOBIAS.....The Phœnix Bridge Co., Jeffersonville, Ind.
WALKER, J. W.....President and General Manager Shiffler Bridge Co., Pittsburgh, Pa.
WATSON, WILLIAM P.....Chief Engineer Seattle and Montana Ry., Seattle, Wash.
WEISKOPF, S. C.....Room 801 Penn Bldg., Pittsburgh, Pa.
WHEELER, S. S.....432 West 14th st., New York City.
WHITCOMB, H. D.....Consulting Engineer, Richmond, Va.
WILEY, WILLIAM H.....53 East 10th st., New York City.
WILKINS, WILLIAM GLYDE.....Room 90, Westinghouse Bldg., Pittsburgh, Pa.
WRIGHT, A. W.....804 National Bank of Commerce Bldg., St. Louis, Mo.

ASSOCIATES.

FUTAMI, KIOSABURO.....Kobe Paper Mill Co., Kobe, Japan.
LEWIS, FRANK C.....(Care Youngstown Bridge Co.), Youngstown, O.
WARDER, J. H.....200 Dearborn ave., Chicago, Ill.

JUNIORS.

BOGGS, EDWARD M.....P. O. Box 1001, San Bernardino, Cal.
BONNETT, CHARLES P.....P. O. Box 790, Yonkers, N. Y.
BUTTS, EDWARD.....City Engineer's Office, Kansas City, Mo.
CARROLL, EUGENE.....Assistant Engineer Peoria Water Co., Peoria, Ill.
CONNETT, ALBERT N.....Assistant Engineer U. S. Construction Co., 1 West Lexington st., Baltimore, Md.
CRANE, WILL E.....Engineer in charge Platt st. Bridge, Rochester, N. Y.

ELLSWORTH, A. B.....(Care Union Bridge Co.), Athens, Pa.
EWING, WILLIAM B..... ..Cazenovia, N. Y.
FRENCH, JAMES B.....(Care Pencoyd Bridge and Construction Co., Pencoyd, Pa.
HORTON, SANDFORD.....Ogden, Utah.
INGALLS, OWEN L.....Inspector Sewer Dept., District Columbia, Washington, D. C.
LAWLOR, F. D. H.....Calle Piedras, 154, Montevideo, Uruguay, South America.
LELAND, GEORGE H.....Troy, Ala.
MAGOVERN, EDWARD E.....P. O. Box 217, South Orange, N. J.
PENNEY, WILLIAM W.....213 North 8th st., St. Louis, Mo.
ROSENBERG, FRIEDRICH.....General Manager Bessemer Ditch Co., Pueblo, Colo.
POTTER, ALEXANDER.....City Engineer's Office, Halifax, N. S.
SMITH, MERRITT H., Jr.....Box 748, Jacksonville, Fla.
STARR, CHANDLER D.....West 86th st. and Riverside Drive, New York City.
TRATMAN, E. E. RUSSEL.....Tribune Bldg., Room 103, New York City.
WADDELL, MONTGOMERY.....18 Columbia Heights, Brooklyn, N. Y.
WOOD, C. F.....Engineer and Superintendent Knoxville Water Co., P. O. Box 72, Knoxville, Tenn.
YATES, PRESTON K.....305 West 55th st., New York City.

DEATHS.

GRAFF, FREDERIC.....Elected Member May 7, 1873; died March 30, 1890.
LEERS, FRANK A.....Elected Member May 4, 1877; died May 19, 1890.
MICHAELIS, OTHO E.....Elected Member May 6, 1874; died May 1, 1890.

Vol. XVI.—June, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JUNE 4TH, 1890.—The Society met at 20 o'clock, President William P. Shinn in the Chair; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As Members: Rawlinson Tennant Bayliss, Marysville, Mont.; Harry Winter Edwards, West Superior, Wis.; John Edwin Greiner, Baltimore, Md.; Carl Robert Grimm, Trenton, N. J.; John Baillie Henderson, Brisbane, Queensland, Australia; Karl Emil Hilgard, Cincinnati, O.; Gilbert Hodges, Boston, Mass.; Charles Comstock Hopkins, Rome, N. Y.; Andrew Langstaff Johnston, Richmond, Va.; Claude William Kinder, Tientsin, North China; William McKelvy Marple, Scranton, Pa.; Charles Eyra Marvin, Macon, Ga.; Mitsugu Sengoku, Tokio, Japan; Reuben Shirreffs, Paterson, N. J.; Charles Wallace Walton, Detroit, Mich.; Ethelbert George Woodford, Pretoria, Transvaal. As Juniors, Wainright Parish, Albany, N. Y.; George Ernest Roehm, Detroit, Mich.; William Lee Sisson, Baltimore, Md.; Charles Horton Smith, Middletown, N. Y.

The Secretary announced the death on June 1st, 1890, of Mr. Francis C. Lowthorp, F. Am. Soc. C. E.

Some informal notes of a visit to the line of the Panama Canal, from the journal of a civil engineer, by J. Foster Crowell, M. Am. Soc. C. E., were presented by the author, and discussed by Messrs. Fteley, Brush, John Bogart, Shinn, Brendlinger and Crowell.

JUNE 18TH, 1890.—The Society met at 20 o'clock, Mr. J. J. R. Croes, M. Am. Soc. C. E., in the Chair; John Bogart, Secretary. Details as to the programme of the approaching convention were announced.

ANNUAL CONVENTION OF THE SOCIETY, HELD AT CRESSON, PA., JUNE 26TH–JULY 1ST, 1890.

FIRST SESSION, Thursday, June 26th, Morning.—The Convention was called to order by the President of the Society, Mr. William P. Shinn.

The Secretary read the provisions of the Constitution relating to the Annual Convention.

The SECRETARY.—It has been the custom, Mr. President, to select the Chairman of the Convention from among members residing in the general vicinity of the place where the Convention is held.

On motion, presented by the local committee, Mr. William Metcalf, of Pittsburgh, Pa., was elected Chairman of the Convention.

Mr. WILLIAM METCALF (taking the chair).—*Mr. President, ladies and gentlemen:* I have been highly honored in being called to preside over this Convention of the American Society of Civil Engineers. I shall endeavor to do the best I can to carry out your wishes, and I can only say that should there be any irregularity in ruling it will be from the want of experience of your Chairman.

Mr. Bogart will now announce the general programme.

The Secretary announced the programme of the Convention.

The SECRETARY.—The committee, consisting of Vice-Presidents Fteley and Cohen, which was appointed to arrange in regard to sequence of papers, has made such arrangement and has posted the order of presentation of papers in the hall of the hotel.

The first paper this morning will be the one on the "Designing and Erection of the Oakley Arch," by Mr. J. Foster Crowell, member of the Society. The paper is in print, and those who have not secured an advance copy will now have the opportunity.

The CHAIR.—I have the pleasure of introducing Mr. Crowell, who will present the paper on the construction of the Oakley Arch.

Mr. Crowell presented the paper.

The SECRETARY.—Mr. President, there is a paper on the "Stability of Loaded Masonry Arches," by Mr. A. S. C. Würtele, M. Am. Soc. C. E. This is also here in print in advance proof form, and the committee considers that the discussion upon this paper and on Mr. Crowell's paper should go together.

In the absence of Mr. Würtele, the Secretary presented the paper.

The CHAIR.—The two papers are now open for discussion.

Discussion upon these papers followed by Messrs. Desmond FitzGerald, Seaman, Whittemore, H. M. Wilson, Bouscaren, Hilgard, Latham Anderson, Landreth, Collingwood, Francis, Charles Paine, Fteley, Tidd, Thackray, Brendlinger, Pullman and Crowell.

A paper on "A Method of Taking Cross-Sections in Deep Rock Cuts by Triangulation," by F. W. Watkins, M. Am. Soc. C. E., was presented by the Secretary.

Mr. Desmond FitzGerald, M. Am. Soc. C. E., presented a diagram with "Some Observations on Evaporation," the result of data gotten at the Boston Water Works in the summer of 1889.

SECOND SESSION, Thursday, June 26th, Afternoon.—The session was resumed at 14.30 o'clock.

The CHAIR.—The first paper this afternoon is the paper by Mr. Lincoln Moss, on "Comparative Tests of an Electric Motor and a Steam Locomotive on the Manhattan Elevated Railway, New York."

Mr. CLEMENS HERSCHEL.—We had this morning the reading and discussion of a long paper. I think every one will agree with me that the discussions are the interesting part of our Conventions. I have not been at a convention for a number of years; at the last one I attended I heard a great deal about the reading of papers taking up a great deal of time. I believe that it is the sense of the Society and that they will support me in the motion I am about to make, which is, that in the case of papers that are in printed form, accessible to the members of the Society, their reading be dispensed with at the Conventions and we pass at once to the discussion.

Mr. OBERLIN SMITH.—I second that motion, and I will occupy a moment in telling some of the experience we had in the Society of Mechanical Engineers. We now print all papers, distribute them and give up five minutes to their presentation; if the author wishes he can use up that five minutes in giving an abstract or description of his paper. When the discussion begins ten minutes is given to any one who has sent in a written discussion and five minutes to a verbal discussion. So we succeed in running everything through on a time table, and very often get through every paper which is on the list, and have a little time to spare.

The CHAIR.—The motion is before you; are there any further remarks?

The SECRETARY.—Mr. President, while agreeing pretty decidedly with what has been said, I think that the motion of Mr. Herschel should be modified to the extent of having the author, if he will, do what Mr. Smith has suggested, that is to say, give a concise statement as to the paper. Unless somebody starts the ball, we do not get any discussion at all. If the author will give the salient points of the paper, as I have done this morning of two or three papers that were in print, and in which I put ten pages into one, then the discussion will start fairly.

Mr. HERSCHEL.—I accept the amendment, that the author of the paper, if he so wish, give a short *resumé* of its contents. My motion was not to read the paper to the Society when it is print.

Mr. SMITH.—Would it not be well for the Secretary to give the abstract when the author is not here?

The CHAIR.—Would you place a limit of time, Mr. Herschel?

The SECRETARY.—I think that could be arranged very equitably as to each paper.

The CHAIR.—If there are no further remarks, the motion is before the house. The motion is, that in the case of all papers that are printed and ready for distribution, the author shall be allowed ten minutes in which to give a *resumé* of the paper.

Mr. A. M. WELLINGTON.—I suggest that you should say a reasonable time. We have here a rather important paper. If it had been distributed in advance, and we had had an opportunity to read it, a time limit might be set. Being a member of the American Society of Mechanical Engineers as well as of this Society, I will say that while I think the general principle is good, my observation of the five minutes rule is that it is not a valuable one in that Society or any other. It tends to throw the discussion into the hands of three or four ready speakers and prevents those who are less fluent, but who may have something quite as valuable to say, from entering into the discussion, and the result is that there is not a really proper discussion of the paper. I have observed that this occurs much more with the Mechanical Engineers than with this Society.

The SECRETARY.—My suggestion was not ten minutes; it was that the author should have a reasonable time, to be fixed by the Committee on Papers. The committee have been engaged with the author in arranging for the paper that comes after the present one—a most interesting paper, a very long paper, which is not in print—and it was arranged that the author should give a *resumé* of the paper, and not try to read the paper at all. In the same way I think that Mr. Moss, who is about to present us one of the most interesting papers we have ever had, could give us a *resumé* of the paper, telling us the results. My intention of an amendment to Mr. Herschel's motion was that the reading of the paper be dispensed with, and that the author, if present, or the Secretary, be requested to give a concise statement of the paper—the time to be determined by the Committee on Presentation of Papers.

Mr. HERSCHEL.—I accept that amendment. As I understand, Mr. Wellington has been talking about the discussion, not the presentation of papers. I accept the amendment as stated by Mr. Bogart.

The Chair put the motion, which was carried.

Mr. Lincoln Moss, C. E., presented a *resumé* of his paper on "Comparative Tests of an Electric Motor and a Steam Locomotive on the Manhattan (Elevated) Railway," New York. The subject was discussed by Messrs. Wellington, Hunt, Oberlin, Smith, Thackray, Francis and Moss.

A paper on "Irrigation in India," by H. M. Wilson, M. Am. Soc. C. E., was presented by the author and discussed by Messrs. J. B. Johnson, Francis, Desmond FitzGerald, Fuller, Meyer and Wilson.

A paper on the "Cheapest Railroad in the World," by Arthur Pew,

M. Am. Soc. C. E., was presented by the Secretary, and discussed by Messrs. Wellington, Metcalf and Whittemore.

A paper on "The Permanent Effect of Strain in Metals; on their Self-registration and Mutual Interactions," by Robert H. Thurston, M. Am. Soc. C. E., was presented by the Secretary and discussed by Messrs. J. B. Johnson, Skinner, H. T. Eddy, Collingwood, Whittemore, Thackray, Hardy, G. H. Thomson, Metcalf and G. H. Browne.

THIRD SESSION, June 26th, Evening.—The session was resumed Thursday evening. The President of the Society, Mr. William P. Shinn, delivered the Annual Address.

At the conclusion of the President's address Mr. Robert B. Stanton, M. Am. Soc. C. E., gave a description, illustrated by the stereopticon, of a boat expedition through the Colorado Cañon, through which he had made a transit survey for the location of a low-grade railroad.

On Friday morning, June 27th, a visit was made, by special train, to the Cambria Iron Works at Johnstown, Pa.

FOURTH SESSION, Friday, June 27th, Afternoon.—The session opened at 14:30 o'clock, Chairman William Metcalf presiding.

A paper on "One Way of Obtaining Brine," by Charles B. Brush, Director Am. Soc. C. E., was presented by the author and discussed by Messrs. Collingwood, Trotter, T. H. McCann and Brush.

A paper on a "New Graphical Solution of the Problem, What Position a Train of Concentrated Loads must have in order to cause the Greatest Stress in any given part of a Bridge Truss or Girder," by Professor Henry T. Eddy, was presented by the author, and discussed by Messrs. Burr, Osborn, J. B. Johnson, Strobel and Eddy.

A paper on a "Comparison of Water Supply Systems from a Financial Point of View," by J. Leland FitzGerald, M. Am. Soc. C. E., was presented by the Secretary and discussed by Messrs. Desmond FitzGerald, Francis, F. L. Fuller, Brush, H. M. Wilson, J. B. Johnson, McCann, Ramsey and Metcalf.

On the evening of Friday, June 27th, the banquet was held at the hotel; at this banquet there were 168 persons, including ladies.

On the morning of Saturday, June 28th, a visit was made by special train to Bell's Gap.

The business meeting of the Convention was held on Saturday afternoon. The minutes will be found on a following page.

FIFTH SESSION, Saturday, June 28th, Afternoon.—Chairman William Metcalf presiding.

THE SECRETARY.—Immediately after the adjournment of the business meeting it has been the custom for the Convention to reassemble and take the action of appointing the Nominating Committee for the ensuing year. That has been done in Convention. Last year the method was to select the committee through the nomination of the members present

from certain geographical districts. Those districts as arranged last year, were: No. 1, Resident Members, New York City, and fifty miles around; No. 2, the rest of New York, New England and Canada; No. 3, Pennsylvania and the South Atlantic States; No. 4, the Southern States, with Missouri, Kansas, Colorado and the Pacific Slope; No. 5, the Ohio River States and the Northwest.

The CHAIR.—If it is the will of the Convention to adopt these districts and this system at this meeting, or some other, a motion to that effect will now be in order.

On motion, the system of last year was adopted.

On motion, a recess of five minutes was taken.

Mr. WILLIAM P. SHINN.—Mr. Chairman, the chairmen representing the several districts have entered on the blackboard the names of their respective nominees. I move, therefore, that the names entered on the blackboard be those constituting the Nominating Committee.

The Secretary read the list as follows: District No. 1, A. M. Wellington; No. 2, William B. Franklin; No. 3, Charles Paine; No. 4, M. L. Holman; No. 5, G. Bouscaren.

The CHAIR.—It is moved and seconded that the names presented on the blackboard, read by the Secretary, be appointed a Nominating Committee. (Carried.) Any further discussion?

A MEMBER.—Mr. Chairman, I would like to ask who is the Chairman of the Nominating Committee. That seems to me rather important.

A MEMBER.—I move that Mr. Charles Paine shall act as Chairman of the Nominating Committee.

The CHAIR.—It is moved and seconded that Mr. Charles Paine be designated and appointed as Chairman of the committee. (Carried.)

A paper on "The Beginnings of Engineering," by J. Elfreth Watkins, Assoc. Am. Soc. C. E., was presented by the author and discussed by Messrs. Herschel, William E. Merrill, McCann, Whittemore and Watkins.

A paper on "Inland Sewage Disposal, with special reference to the East Orange, N. J., Works," by Carroll Ph. Bassett, M. Am. Soc. C. E., was presented by the author and discussed by Messrs. McCann, Wellington, F. L. Fuller and Bassett.

SIXTH SESSION, Monday, June 30th, Morning.—The session of the Convention was resumed at 10 o'clock, Chairman William Metcalf presiding.

A paper on "The Littoral Movements of Inlets along the Coast of New Jersey," by Lewis M. Haupt, M. Am. Soc. C. E., was presented by the Secretary and discussed by Messrs. Collingwood and Francis.

A paper on "Street Electric Railways," by O. H. Landreth, M. Am. Soc. C. E., was presented by the author and discussed by Messrs. Crowell, Collingwood, Oberlin Smith, Fava and Landreth.

Some "Water Works Items," collated by Mr. F. E. Sickels, C. E., were presented by Mr. Charles B. Brush, Director Am. Soc. C. E.

A paper on "The Ventilation of Tunnels," by N. W. Eayrs, M. Am. Soc. C. E., was presented by the Secretary.

A paper on the "Causes of Trade Winds," by F. A. Velschow, C. E., was presented by the Secretary.

The paper on "Observations on the Forth Bridge," by C. E. Emery, M. Am. Soc. C. E., was presented by title.

A paper on "A Practical Method for Reducing the Internal Wastes of Steam Engines," by R. H. Thurston, M. Am. Soc. C. E., was presented by the Secretary.

A paper on the "Turn-table on the Silverton Railroad," by C. W. Gibbs, M. Am. Soc. C. E., was presented by the Secretary and discussed by Mr. J. Foster Crowell.

A paper on "Some Recent Repairs of the Canal at Mechanicville, N. Y.," by John Bogart, M. Am. Soc. C. E., was presented by the author and discussed by Colonel Merrill, Messrs. Crowell, C. L. Johnson, Brendlinger, Antes Snyder and Bogart.

Mr. Antes Snyder, C. E., gave a history of the South Fork Dam and description of its failure, and the subject was discussed by Messrs. Bogart, Brush, Collingwood, Crowell, Oberlin Smith, McCann, Brendlinger, Merrill, Haines, Brown, Becker, Cohen, Francis, Goad, Skinner and Snyder.

The following resolution was offered by Mr. Oberlin Smith:

Resolved, That it is the opinion of this Convention that more systematic methods than now exist should be devised and put into operation for the protection of coal miners: 1st, in regard to the making and keeping of correct and accurate mine maps and other records of position; 2d, in the establishment of simple and obvious means of communication with imprisoned miners by means of telephone wires, air pipes and pipes for liquid food—such wires and pipes to be carried forward into all important drifts as the work therein proceeds; and 3d, in the substitution of mine lighting by electricity, rather than by the frequently dangerous lamps now used.

The Chair ruled that this resolution was out of order, being an expression of opinion which this meeting should not give.

The SECRETARY.—I move that this Convention of the American Society of Civil Engineers orders a vote of thanks to be tendered to the presiding officer of this Convention, to the members of the Local Committee, to the Cambria Iron Works, to the officers of the Pennsylvania Railroad, and to all others who have been instrumental in making this Convention a success. (Seconded and carried.)

The Convention then adjourned.

The following 143 members were in attendance at the Convention:

Fred. J. Amweg, Philadelphia; William L. Abbott, Pittsburgh, Pa.; W. A. Aiken, Mount Vernon; Latham Anderson, Cincinnati, Ohio; Thomas W. Baldwin, Bangor, Me.; John W. Bacon, Danbury, Conn.; William Henry Baldwin, P. F. Brendlinger, Yonkers; William F. Booth, Poughkeepsie; John Bogart, W. A. Brackenridge, Charles B. Brush, New York City; Oscar F. Balston, Brooklyn, N. Y.; Carroll Ph. Bassett, Newark, N. J.; W. H. Barnes, M. F. Bonzano, Philadelphia; A. Bonzano, William H. Burr, Phœnixville, Pa.; Channing M. Bolton, Washington, D. C.; M. L. Byers, Mahoningtown; Max. J. Becker, Charles Blackwell, A. F. Brown, George H. Browne, Pittsburgh, Pa.; G. Bouscaren, Cincinnati, Ohio; J. Foster Crowell, New York City; H. Wadsworth Clarke, Syracuse, N. Y.; F. Collingwood, Elizabeth, N. J.; Amory Coffin, Phœnixville, Pa.; Mendes Cohen, Baltimore, Md.; William C. Cushing, Zanesville, Ohio; O. Chanute, Chicago, Ill.; Stancliff B. Downes, C. Wheeler Durham, New York City; Harry G. Darwin, Glen Ridge, N. J.; James G. Dagron, Baltimore, Md.; John B. Duncklee, Washington, D. C.; Charles Davis, Paul Didier, Allegheny; George S. Davison, A. Dempster, Pittsburgh, Pa.; F. G. Darlington, Indianapolis, Ind.; Theodore N. Ely, Altoona, Pa.; James B. Francis, Lowell; Desmond FitzGerald, Brookline; Frank L. Fuller, Boston, Mass.; Burr K. Field, East Berlin, Conn.; A. P. Folwell, A. Fteley, New York City; J. Foster Flagg, Brooklyn, N. Y.; Clark Fisher, Trenton, N. J.; W. L. Ferguson, Baltimore, Md.; Frank Firmstone, Easton, Pa.; E. Fisher, Detroit, Mich.; Edward B. Guthrie, Buffalo, N. Y.; Charles E. Goad, Toronto, Canada; Bernard R. Green, Washington, D. C.; Carl Gayler, St. Louis, Mo.; Richard A. Hale, Lawrence, Mass.; George R. Hardy, New Haven, Conn.; Stephen S. Haight, Charles M. Harris, William J. Haskins, Clemens Herschel, New York City; William E. Hoyt, Rochester, N. Y.; Caspar Wistar Haines, Philadelphia, Pa.; Peter C. Hains, Washington, D. C.; William M. Hughes, Alfred E. Hunt, Pittsburgh, Pa.; K. Emil Hilgard, Cincinnati, Ohio; Robert W. Hunt, Chicago, Ill.; Chauncey Ives, Chambersburg; Washington Jones, Philadelphia; Thomas H. Johnson, Pittsburgh, Pa.; J. B. Johnson, St. Louis, Mo.; Walter Katté, New York City; Paul S. King, Buffalo, N. Y.; Gustave Kaufman, George Watson Kittredge, Pittsburgh; D. Jones Lucas, Philadelphia, Pa.; Thomas D. Lovett, Cincinnati, Ohio; Olin H. Landreth, Nashville, Tenn.; Mace Moulton, East Berlin, Conn.; Henry C. Meyer, T. Spencer Miller, New York City; Thomas H. McCann, Hoboken, N. J.; Henry G. Morris, Philadelphia, Pa.; Henry G. Morse, Edge Moor, Del.; Edwin Mitchell, Chambersburg; William Metcalf, Pittsburgh, Pa.; William E. Merrill, Cincinnati, Ohio; H. I. Miller, Louisville, Ky.; F. O. Norton, New York City; George B. Nicholson, Covington, Ky.; F. S. Odell, New York City; Frank C. Osborn, Cleveland, Ohio; Henry G. Prout, New York City; William A. Pratt, Wil-

mington, Del.; John A. Partridge, Washington, D. C.; George W. Parsons, Steelton; Robert E. Pettit, Altoona; Charles Paine, Pittsburgh, Pa.; J. W. Pearl, Massillon, Ohio; Joseph R. Richards, Boston, Mass.; Palmer C. Ricketts, Troy, N. Y.; Percival Roberts, Jr., Philadelphia, Pa.; Thomas Rodd, Pittsburgh, Pa.; Benjamin Reece, Chicago, Ill.; Joseph Ramsey, Jr., Cincinnati, Ohio; J. Parker Snow, Boston, Mass.; Frank W. Skinner, New York City; Henry B. Seaman, Brooklyn; Reuben Shirreffs, Paterson, N. J.; T. Guilford Smith, Buffalo, N. Y.; Oberlin Smith, Bridgeton, N. J.; C. C. Schneider, Samuel L. Smedley, Philadelphia; William P. Shinn, Pittsburgh, Pa.; C. L. Strobel, Chicago, Ill.; Robert B. Stanton, Denver, Colo.; M. M. Tidd, Boston, Mass.; G. H. Thomson, John Thomson, Calvin Tomkins, Stevenson Towle, Louis L. Tribus, Alfred W. Trotter, New York City; George E. Thackray, Johnstown; E. B. Taylor, Pittsburgh, Pa.; T. Kennard Thomson, Ceredo, W. Va.; Bushrod W. Taylor, Louisville, Ky.; John G. Van Horne, Theodore Voorhees, Charles S. Warner, A. M. Wellington, William H. Wiley, William E. Worthen, New York City; J. Elfreth Watkins, Herbert M. Wilson, Washington, D. C.; William Glyde Wilkins, Pittsburgh, Pa.; F. M. Wilder, Indianapolis, Ind.; Fred. C. Weir, Cincinnati, Ohio, and D. J. Whittemore, Milwaukee, Wis.

Sixty-five ladies of the families of members accompanied them on the occasion of this convention.

MEETINGS OF THE SOCIETY.

JUNE 28TH, 1890.—(Business meeting during the Convention) William P. Shinn, President Am. Soc. C. E. in the chair; John Bogart, Secretary.

On motion of Mr. C. B. Brush, the reading of the minutes of past meetings was postponed.

The report of the Committee on the Compressive Strength of Cements and the Compression of Mortars and Settlement of Masonry, was called for.

Mr. F. COLLINGWOOD.—Mr. President, our Committee has done no work during the last six months. The difficulties connected with the work are such that until we find some one who has time to spare there is really little to be done. Our Past President, Mr. Whittemore, one of the members of the Committee, has some results which I think he would greatly benefit the Society by giving. Professor Swain, another member of our Committee, writes me that he hopes to do some work this year.

The PRESIDENT.—Gentlemen, you have heard the report of the Committee on Compressive Strength of Cements. What is your pleasure concerning it?

Mr. MENDES COHEN.—I move that the report be accepted and the Committee continued. (This motion was carried.)

The report of the Committee on Uniform Methods of Testing Materials used in Metallic Structures and on Requirements for these Materials to Further Improve the Grade of such Structures was called for.

Mr. J. G. DAGRON.—Mr. President, the Chairman not being present, I will say for the Committee that the Committee has held several meetings, but of course has not yet been able to accomplish much; we therefore beg leave to report progress, and ask that the Committee be continued.

On motion of Mr. Cohen, the progress report of the Committee was accepted and the Committee continued.

The CHAIR.—Is there any report from the Committee on Standard Rail Sections?

Mr. D. J. WHITTEMORE.—In connection with that matter, I have a communication to give to the President, which he can read to the meeting, or not, as he pleases.

The CHAIR.—The communication of Mr. Whittemore, which is a declination to serve upon the Committee for reasons given, does not properly come before this meeting; it goes before the Board of Direction. I may say that I was informed yesterday by the Secretary of this Committee that the Committee would have no report to make at this meeting. There appears to be no one to speak for the Committee here, and I suppose we must consider that to be the state of the case.

The report of the Committee on the Impurities of Domestic Water Supply was called for.

The PRESIDENT.—There is a communication from a member of this Committee, or rather from a member of the Society, who was appointed upon this Committee, but he declines to serve upon the Committee, and sends in what is termed a minority report. I shall rule upon that, that a minority report cannot be received unless there is a majority report. Is there any appeal from the ruling of the Chair? If not, I will turn this communication over to the Board of Direction for such action as they in their wisdom may see proper to take.

The report of the Committee on Uniform Standard Time was called for.

The SECRETARY.—I think it is proper that I should say for that Committee, as Mr. Charles Paine, one of the members of the Committee, has just gone out, that the action outlined by the resolution offered at the Annual Meeting in January last, which was afterwards adopted by the Society by letter-ballot, has been followed by the Committee; that is, the preparing a memorial to be presented to Congress, and that the matter is now in the hands of a sub-committee of which the President is one of the acting members. I should say that the Committee on Uniform Standard Time reports progress.

The PRESIDENT.—I think it proper to say that Mr. Fleming, who as you know is the Chairman and active man upon this Committee, having gone to Europe, could not serve upon this sub-Committee to present the memorial to Congress, and from the inability of some of the members of this Committee to act as a sub-Committee, the matter apparently fell into the hands of the officers of the Society, and, as President, rather than as a member of the sub-Committee, I sent the proof of the proposed Act of Congress to Professor Langley, of the Smithsonian Institution, for his criticism, with a view of having it presented in both houses of Congress so as to get it referred to the proper committees in Congress, in order that it may come up for consideration at the next session. The next session of the present Congress can act upon business which is presented at this session, and it would then be in progress and have an opportunity of being taken up. I have not heard from Professor Langley yet. It is only about four or five days ago that I sent him the copy.

The SECRETARY.—I have a communication which has been sent to the Secretary for presentation at this meeting; it is as follows:

JOHN BOGART, C. E.,
Secretary American Society of Civil Engineers.

MY DEAR SIR,—I enclose herewith a petition, which I would like you to present to the Society of Engineers.

The room for engineers, for which I make an appeal, is located in the Fannie Paddock Hospital, at Tacoma, Wash.

I realized the need of such a resort for engineers during the illness of the late Henry G. McClellan.

Within the past year, a commodious hospital has been built in the town, and it was my desire that some specific provision be made for the engineers. I investigated the matter while there last winter, and through the aid of the following gentlemen, I have been able to furnish such a room, with an adjoining bath-room, completely, making my purchases in town, when I could attend to the selection, and by the kind consideration of the Pennsylvania and Northern Pacific Railway Companies, I have received all transportation gratuitously. I anticipate by the 15th July that the room will be ready for occupancy. With the thought of furnishing has come the desire to endow the room, an appeal to this effect coming from Mr. Huson, Chief Engineer of the Western Division of the Northern Pacific, assuring me that he would endeavor to raise half the amount. It has been found by the Board of Directors that $3 000 is the lowest possible figure for the endowment of such a room—this sum being double what I at first supposed. As Mr. Huson feels that liberal contributions will be made to this effect, I feel justified in laying the matter before the Society, seeking their hearty coöperation in the support of such a free room, to enable me to raise the required $1 500.

The following gentlemen have already sent in their subscriptions: M. Lassig, George O. Morison, W. H. Holcomb, H. M. McCartney, E. L. Corthell, O. F. Nichols, W. H. Kennedy and corps, William Mason, George M. Bogue and M. D. Bogue.

Trusting this may meet the hearty coöperation of the American Society of Engineers, in behalf of their remote Brotherhood,

I am very truly yours,

JENNIE A. BOGUE.

The PRESIDENT.—This means civil engineers; it does not mean engine drivers.

Gentlemen, you have heard the communication, what action will you take upon it?

WILLIAM METCALF.—I move that it be received and referred to the Board of Direction. (This motion was seconded and carried.)

The report of the Committee on the Revision of the Constitution was called for.

The PRESIDENT.—As I am unfortunately in the dual position of Chairman of the Committee and President of the Society, I will ask Vice-President Cohen to preside while I make the report of the Committee. (Mr. Cohen took the chair.)

Mr. WILLIAM P. SHINN.—On behalf of the Committee on Revision of the Constitution, I beg to submit this report (read the report of Committee as printed in advance form and distributed at the Convention. See following pages.)

The CHAIR (Mr. Cohen).—Gentlemen, you have heard the report of the Committee; the question will be upon its acceptance.

Mr. CLEMENS HERSCHEL.—I move that the report of the Committee be accepted and the Committee continued. (Seconded.)

Mr. SHINN.—I would like to make a little explanation to the Society before the vote is taken, in order that the members may understand the position in which the Committee has found itself. This subject of the Revision of the Constitution, as you may perceive from the reference made in the report to the number of suggestions received, was found to be a very large one. The Committee, as originally appointed, was ordered to report at the Annual Meeting in January last. It was found that, in order to make a report which should embody an amendment to the Constitution, that report must be before the Society at the meeting in the first week in November, and the Committee discovered at its first meeting that it could not possibly get over the ground in time to make such a report. There not being time in which to properly consult and hear the views of the local societies, the matter of asking their opinions and expressions was postponed until the action by the Society upon the report of progress made by the Committee at the annual meeting. It was not until March that that action was finally made, by the adoption of the codified Constitution and the amendment to the amending clause. If the amendment to the amending clause had not been made, then the question could not have come up at this meeting at all; that is, the report of the Committee would have had to have gone over to the Annual Meeting.

In order, therefore, to give the representatives of the local societies a proper opportunity to be heard, the Committee found that it was necessary, as stated in the report, to put off the receiving of replies until the beginning of June, and it was necessarily out of the power of this Com-

mittee to make a report embodying an amended Constitution to be acted upon by this Convention, because such report would have had to have been submitted to the meeting of the Society in April, so that you can easily see that we have been governed by the necessities of the case and by the propriety of giving the local societies time to act and to make their replies. It seemed, therefore, to the Committee that it was best to take all the time that was necessary and try to get up something that would meet with the approval of the Society. For these reasons we have asked our continuance.

The CHAIR.—It is moved and seconded that the report be received and the Committee continued. (Carried.)

The SECRETARY.—Mr. President, I have a communication from the Western Society of Civil Engineers. It is as follows:

CHICAGO, June 21st, 1890.

JOHN BOGART, Esq., C. E.,
Secretary Am. Soc. C. E.,
New York.

DEAR SIR,—At a special meeting of the Western Society of Engineers, held June 18th, 1890, the accompanying report on an International Engineering Congress was unanimously adopted, and the following Committee appointed:

E. L. CORTHELL,
O. CHANUTE,
D. J. WHITTEMORE,
BENEZETTE WILLIAMS,
CHARLES FITZSIMONS,
ROBERT FORSYTH,
(*Acceptance pending*).

In accordance with this action of this Society, and under instructions of the committee, your Society is respectfully requested to appoint a committee to meet with the committee of this Society and the committees of other societies, at the rooms of the Western Society of Engineers, 78 La Salle street, Chicago, at 10 A.M. Wednesday, October 1st, next.

Please inform me what action your Society takes in this matter.

Yours respectfully,
JOHN W. WESTON,
Secretary.

REPORT OF COMMITTEE ON INTERNATIONAL ENGINEERING CONGRESS.

CHICAGO, June 18th, 1890.

To the President of the Western Society of Engineers:

MR. PRESIDENT,—The Committee on the proposed International Engineering Congress, to be held in this city in 1893, during the World's Columbian Exposition, presents the following report:

We are decidedly of the opinion that such a Congress should be convened. It is eminently fitting that engineers, representing the various branches of engineering, should be called together from all parts of the civilized world on the occasion of the celebration of the 400th anniversary of the discovery of this continent; to not only consider the many great works which our profession has performed for the use and convenience of man, but to learn from each other much that will be of mutual benefit;

to obtain a concensus of opinion on many important principles and projects now in process of development; and, finally, to hold that extended social intercourse enjoyed by engineers only on such rare occasions. While these reasons refer largely to the advantages of such a Congress from an international point of view, we are deeply sensible of the necessity and importance of bringing together the various, but almost distinct branches of engineering of our own country, in order that we may come, for the time at least, into more cordial sympathy and learn from each other much of importance in those branches in which each is expert.

The scope of the Congress should be broad, including all branches of civil engineering, in its divisions into civil (distinctively so known), mechanical, mining and electrical engineering, also military and naval engineering.

Engineering societies in other countries should be asked to send delegates to the Congress, and governments themselves should also be requested to send representatives.

We recommend:

First.—That this Society initiate the preliminaries for the Congress by requesting each of the national societies—the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Electrical Engineers, and the Canadian Society of Civil Engineers—to appoint a committee of not more than five members (two at least of which shall be residents of Chicago or vicinity), to meet in this city on October 1st of this year, with a committee of seven of this Society, for the purpose of formulating the plans for the Congress.

Second.—That all local engineering societies of the United States and Canada, of recognized standing, be requested to send to this meeting committees of not more than three delegates, and that the committee of this Society be authorized to appoint, as delegates to this meeting, one or more engineers from those sections of the country that have no engineering organizations.

Third.—That the committee of this Society be instructed to confer at once with the proper committee of the Exposition, with the view of arranging for the Congress to be held under the auspices of the Exposition, and under its general management.

Fourth.—That the correspondence be conducted in the name of this Society and by its Secretary, who shall represent this Society during all of the proceedings, and who shall also act as Secretary for the committee to be appointed as herein provided.

In conclusion, the necessity and duty rests upon this Society to perform in a large measure the laborious work required to convene and organize the Congress. While the work may be in immediate charge of a committee, every member of the Society should be ready at all times to assist in any way that lies in his power.

We strongly recommend immediate action by this Society, and the appointment at this meeting of a committee of seven, which shall be instructed to prepare and send out, without delay, a circular letter to the national and local societies of the United States and the Dominion of Canada.

Respectfully submitted by your committee,

E. L. Corthell,
O. Chanute,
D. J. Whittemore,
Benezette Williams,
Chas. FitzSimons.

The PRESIDENT (in the chair).—I wish to point out to the two members of that Committee who are here present, that the date fixed for the meeting in Chicago is the date of the meeting of the Iron and Steel Institute of Great Britain to be held in New York, and that it will be somewhat difficult for representatives of this Society who are to meet these people, particularly for the representatives of the Mining Engineers and other American engineers, to be at Chicago on the first of October, or during that week. That was probably not thought of, and the question of date may be arranged. The programme for the visit and the meetings of the British Iron and Steel Institute and the other visiting bodies is that they shall hold what is distinctively their meeting in the City of New York; the Institute of Mining Engineers will hold their meeting directly afterwards. The two bodies will hold what they term international sessions in Pittsburgh on the 9th, 10th and 11th of October, and will then proceed to Chicago, and the time of the visiting bodies and such members of the American societies as may accompany them will be fully occupied from the 28th of September until the 28th of October. I mention this difficulty of the date, which is a detail that can be changed, for your benefit.

You have heard the communication of the Western Society of Engineers, together with the report of their Committee on an International Engineering Congress which was adopted by that Society. What action will you take upon it?

Mr. PERCIVAL ROBERTS.—I move that it be received. (Seconded.)

Mr. DON J. WHITTEMORE.—As you all understand, there is to be an exposition in Chicago in 1893, and it will be largely an exhibit of engineering works, and it seemed to the members of our profession residing in Chicago that it would be eminently proper at that time to have a national organization so that all departments of engineering can be represented. And we felt, as members of the Engineering Society of the West that the play of "Hamlet" cannot be fairly indicated in the absence of Hamlet, so it was decided that this first should be brought to the attention of the American Society of Civil Engineers for its action, and we hope that it will result in the appointment of a committee to devise a method by which this proposed organization can be effected. I trust you will give it your serious consideration.

The PRESIDENT.—The question now before the Society is merely on the acceptance of the communication. I would suggest that that scarcely calls for any considerable discussion.

Mr. WHITTEMORE.—Then I shall not duplicate those remarks.

The PRESIDENT.—All in favor of the acceptance of the communication of the——

Mr. METCALF.—I suggest, the motion was to receive.

The PRESIDENT.—All in favor of the motion to receive the communication of the Western Society of Engineers, etc. (Carried.)

Now the communication is properly before the Society.

Mr. O. CHANUTE.—Mr. Chairman, I move that the Board of Direction be requested to appoint representatives for the meeting to be held in Chicago, and I would say that as the chairman has pointed out the difficulties that exist as to the date selected in Chicago, it would be, I think, an easy matter to arrange for a subsequent date. The visiting members and the representatives of the Society ought to be in Chicago on the 13th and 14th of October, and, if it be desired, that time may be set apart for the meeting which has been proposed. (Seconded.)

The PRESIDENT.—I would point out the fact in this connection that the Board of Direction would probably not have a meeting until the first week in September.

Mr. CHANUTE.—May I amend my motion, and make it that the Committee be appointed by the Chair?

The PRESIDENT.—The motion is amended that the Committee be appointed by the President. Is the amendment accepted by the seconder of the motion? (Accepted.) It is moved and seconded that the representatives of this Society, as asked for in the communication, be appointed by the President. Any remarks upon that motion will now be in order.

Mr. J. FOSTER FLAGG.—I would like to ask a question: whether this proposed Congress in 1893 is to be composed of delegates from the different societies or of any members of the Society that choose to attend it?

The PRESIDENT.—I understand from the papers read, that this meeting proposed to be held on the 1st of October is to provide and arrange and decide upon a method and scope, etc., for this Congress. Is that it?

Mr. WHITTEMORE.—That is so.

The PRESIDENT.—Therefore that question could not be answered at this time. If this Society appoints representatives to attend this meeting, then its representatives will have an opportunity to be heard, and it follows, as a matter of course, that the appointment of representatives to attend that meeting does not commit this Society to what that meeting may decide upon. The matter will still come up before the Society.

Mr. METCALF.—You have answered a question I was about to ask. If this Committee has no further authority, and it is to report back to the Society, then it is eminently proper, I think.

The SECRETARY.—The motion is that the Committee be appointed by this Society, in compliance with this request. There was nothing in the motion saying that the Committee should report back to the Society.

Mr. METCALF.—That is the very point I was making; but the Chair decided that the Committee had no authority, except to report back to the Society. The appointment of such a committee I think an eminently proper one, but I think it should be clearly expressed that this Committee is to report back to the Society.

Mr. CHANUTE.—I accept that amendment.

The PRESIDENT.—Mr. Chanute accepts the amendment that the Committee shall report back to the Society for their further action.

A MEMBER.—Will the Secretary read the form of invitation that was sent.

The Secretary again read the letter accompanying the communication.

The PRESIDENT.—After looking over carefully the report of the Committee of the Western Society submitted with this information, I should rule that, while we might decide to send delegates to this proposed meeting for the purpose of formulating a plan for holding a Congress, it is entirely competent that we say to those delegates that the Society is not committed to that Congress unless it has the approval of the Society subsequently; and that can be, and is, embodied in the motion of Mr. Chanute, as amended, so that the motion as it now stands is, that the President be authorized to appoint representatives to the meeting to be held under the invitation of the Western Society, and that the action of that meeting be reported to the Society for its further action in regard to the Congress. Does that cover your motion?

Mr. CHANUTE.—Yes, sir.

Mr. OBERLIN SMITH.—I will make a suggestion here, that it would be better to have that meeting while the English people are there in Chicago than subsequently. The reason is that those twelve delegates from the four societies, appointed outside of Chicago, would find it more convenient to go there at that time than to make a second trip; and, secondly, that there would be a chance of getting the ideas of these English people which might modify the action.

Mr. CHANUTE.—That, sir, is what I have indicated, that the visiting members ought to be in Chicago on the 13th of October, and that it would be a proper time to have the sessions of these various delegates.

The PRESIDENT.—It is not in the power of this meeting to decide when that meeting shall be held, but Mr. Chanute, representing the Western Society of Engineers, under whose auspices the meeting is to be held, expresses the opinion that it can be held at that time, between the 13th and 15th of October.

Mr. Chanute's amended motion was then carried.

The PRESIDENT.—I think if it should be the desire of the membership that the President should be one of those representatives it would be proper for the Society to say so, as the President would scarcely like to appoint himself, and it occurred to me that probably you would so desire.

Mr. WHITTEMORE.—That would be very gratifying indeed.

Mr. CHANUTE.—As the mover of the resolution, I beg to express the utmost desire that the President of this Society shall act as one of the Committee. I move, therefore, that the President shall be at the head

of the delegation of the American Society of Civil Engineers. (This motion was seconded and carried.)

The SECRETARY.—Mr. President, I have no other business to bring before this business meeting.

Mr. OBERLIN SMITH.—If in order, I want to ask a question regarding what was done with the communication last autumn from the American Society of Mechanical Engineers to this Society regarding the appointment of a committee to act with a committee from that and from other societies, forming a committ e of twelve, to formulate a general scheme of federation of the societies?

The PRESIDENT.—The Secretary can inform Mr. Smith.

The SECRETARY.—I have already informed Mr. Smith to-day. No such communication was received from the American Society of Mechanical Engineers. A communication from a member of this Society was received by the Society and referred to the Board of Direction, which referred it to the Committee on Revision of the Constitution.

Mr. SMITH.—Mr. Secretary's answer is fuller than I had time to get from him before. He merely informed me before that nothing had been done, that nobody had been appointed. I would like to ask what was done by the Committee on Revision, whether it was considered?

The SECRETARY.—The communication was from Mr. Henry R. Towne, individually, and he has had a full reply from the Board of Direction.

The PRESIDENT.—As I understand, this communication did not come to us as a communication from the Society of Mechanical Engineers; it came to us as a communication from Mr. Henry R. Towne. It was referred to the Board, by them to the Committee on Revision of the Constitution; by that committee to its sub-committee, who had some correspondence with Mr. Towne, and at the last meeting the sub-committee reported to the main committee, and the main committee reported to the Board that it was inexpedient to take the action proposed by Mr. Towne, and the information of this action was sent to Mr. Towne.

Mr. SMITH.—I thought the communication was an official one. I had no idea that it came from Mr. Towne as an individual.

The SECRETARY.—We have never had any communication from the Society of Mechanical Engineers on that subject.

Mr. SMITH.—I thought this communication was official. I believe the Mining Engineers and the Electrical Engineers and the Mechanical Engineers did appoint such committees. I know it was to be done officially, and it should not be left to an individual to do, unless he was acting as chairman.

The SECRETARY.—Does Mr. Smith understand that this movement originated with the American Society of Mechanical Engineers?

Mr. SMITH.—The Society voted last November to appoint a committee, to consist of Dr. Coleman Sellers and, I think, Mr. Towne and

another, and the other societies were to be asked to appoint a committee of three, forming a joint committee of twelve. I know that it was done and voted upon.

The SECRETARY.—We never had that information. We had a communication signed by Mr. Towne himself, marked "Confidential." Then I asked Mr. Towne whether it was desirable to discuss this matter with gentlemen to whom he had sent the communication, and he said, "Certainly." He certainly acted in all those letters as an individual, not as officially representing the American Society of Mechanical Engineers in suggesting this.

Mr. SMITH.—I know that the Secretary of the Society of Mechanical Engineers was authorized to arrange this matter, and I supposed that he had done it.

The PRESIDENT.—I have never heard of any official communication coming to us.

Mr. SMITH.—I will make a motion that a committee of three be appointed by the Society to communicate with committees of three from each of the other three societies, forming a joint committee of twelve, to consider this matter.

The PRESIDENT.—We can scarcely take that action unless we were able to set forth before the Society what that matter is.

Mr. SMITH.—The matter was simply the general one of some scheme of affiliation or federation between these four national societies, without committing themselves in any way and without forming any new society.

The SECRETARY.—We have never heard of such a thing. Mr. Towne sent, and there was presented to the Board of Direction, a communication inclosing a constitution and by-laws creating a new society. This was a printed document, with the word "Confidential" printed at the top; and this was a large scheme for the creation of a new organization; it was not for a federation at all. On the contrary, it was different from a federation—it was an organization to be composed of certain selected members of the different societies, and the others left out. That is the communication upon which the Board of Direction acted, upon the report of this Committee on the Revision of the Constitution, to which Committee has been referred all communications with various different suggestions, and which committee has communicated with the different societies. It reported to the Board of Direction that it was inexpedient to do what Mr. Towne suggests. That is the only scheme that has come before the Board of Direction of this Society, or that I have heard of. There was to be an Institute of Engineers, and a senate selected from the members of the Institute; they were to be the senators of the Institute of Engineers in the United States.

Mr. WILLIAM E. WORTHEN.—Has it not been published in the papers?

The SECRETARY.—Our copy did not go there.

The PRESIDENT.—I would add that it seemed to the members of the Committee on the Constitution that it was utterly and wholly a matter for individuals, in their professional and private capacity, to associate themselves together in that way if they so desired, but not as members of the American Society of Civil Engineers or of the American Society of Mechanical Engineers, or of any other society; and that it would certainly give great offense to our members to take any action upon a thing which was to be of benefit to only a portion of our Society.

Mr. MAX J. BECKER.—If there is no other subject before the Society of more importance than that which has been taken up for the last twenty minutes, I move that we adjourn.

Professor OLIN H. LANDRETH.—There seems to be a large amount of misunderstanding, some of which I think can be cleared up.

The PRESIDENT.—There is no misunderstanding of the subject which has been presented to the Board of Direction. Now, if Mr. Smith is presenting another subject, that subject can be considered; but the subject that has been presented to the Board is exactly what I have explained and the Secretary has explained. That subject has been disposed of definitely and cannot come up again for discussion at this meeting. If there is a new subject presented, and it is within the capacity of this meeting to entertain it, we will be ready to listen to it.

Professor LANDRETH.—In order to bring the matter before the house in good form, I move that a committee be appointed to consider the general subject of federation between the general societies.

The PRESIDENT.—I rule that as out of order because this subject is now in the charge of the Committee on the Revision of the Constitution.

Mr. WILLIAM METCALF.—I move that this be laid upon the table. (Seconded.)

A MEMBER.—There is a motion before the house which has been seconded.

The CHAIRMAN.—There is a motion to lay upon the table.

Mr. SMITH.—I want to say that motion——

Mr. METCALF.—I rise to a point of order. I believe a motion to lay upon the table is not debatable. (Vote put. Carried.)

Mr. BECKER.—I move that we adjourn.

On motion, the business meeting of the Society held during the Convention adjourned to July 2d, for the purpose of then canvassing the current ballot for membership.

American Society of Civil Engineers.

Report of the Committee on Revision of the Constitution and By-Laws.

Presented at the Annual Convention of 1890.

To the Members of the American Society of Civil Engineers.

Your Committee on Revision of the Constitution and By-Laws submits its second report of progress. Its previous report, submitted at the annual meeting of the Society, embodied a codification of the present constitution, with an amendment of the article upon amendments, which was submitted to letter ballot and the ballots upon which were counted at the meeting of the Society of March 5th, when the codification and the amendment were found to have been adopted.

The Committee has held meetings at the Society rooms on February 5th, March 5th and June 4th; at the second of these meetings all the members were present, and at the other two meetings there was more than a quorum present.

The time of the Committee since the annual meeting has been mainly occupied in considering the subject of the formation of branch societies and of affiliation with existing local societies. In answer to the invitation of the Committee there were received from members of the Society sixty-two communications containing suggestions upon this subject. At the meeting of March 5th, the Committee having considered all the suggestions made, embodied them in several plans, and issued a circular which was sent to the officers and representatives of twenty-seven local societies, which includes all of which the Committee had knowledge. This circular was as follows:

127 East Twenty-third Street,
New York, March 26th, 1890.

Gentlemen:—The Committee of the American Society of Civil Engineers, appointed at the Annual Convention in June, 1889, to report upon a systematic revision of the Constitution and By-Laws of the Society, was

authorized to confer with any committee appointed for the purpose by a local engineering society, with a view of determining whether a satisfactory basis can be established for an affiliation therewith.

In carrying out its duties, the Chairman, on August 7th, 1889, addressed to you a communication, advising you thereof and inviting the appointment of a committee for the purposes set forth. The limited time then allowed this Committee in which to report made such conference in many cases practically impossible. This time has since been extended and this Committee now begs leave to renew its presentation of the matter and requests that you will favor it with any plans or suggestions that may occur to you which may tend to promote the objects contemplated.

To afford time for the formulation and presentation of such views, this Committee has fixed its meeting for the purpose of receiving them, on the first Wednesday of June next, at the House of the Society in the city of New York, where it will be pleased to receive the Committee of your Society which has been or may be appointed.

It is desirable that the views of your Society should be presented in writing.

This Committee has already received many propositions on the subject, differing radically from each other. Five such, marked respectively A, B, C, D, and E, are sent herewith for the purpose of showing the scope of the suggestions made to the Committee.

The Committee, before taking action, is anxious to have the benefit of your co-operation. It will therefore be glad to have you present your views upon the subject, together with any plan that may, in the judgment of your Society, be best calculated to attain the end desired.

Communications should be addressed to the Chairman of this Committee, at the Society House.

By order of the Committee.

Respectfully submitted,

WILLIAM P. SHINN,
Chairman.

PLAN A.

1.—Ten or more members of the Society not residing within fifty miles of New York, but residing within thirty miles of any other stated point, may form themselves into an Association which shall become a Local Association of this Society under the following provisions :

2.—Such Association may adopt By-Laws not inconsistent with this Constitution, as it now is, or may hereafter be amended. Such By-Laws shall provide for electing annually a Chairman, Local Secretary and Local Treasurer, for the appointment of requisite Committees, and for certain stated meetings. The Board of Direction shall have power to declare by a two-thirds vote that such Local By-Laws, or any part thereof, or any amendments thereto, are null and void as inconsistent with this Constitution.

3.—All persons connected with this Society in any grade, residing within the said distance of thirty miles of said headquarters, shall thereupon be notified that said Association has been formed, and shall be classed, if they consent, as Resident Members thereof, with the right to vote and hold office therein, and shall be subject, if they consent, to the established additional dues for Resident Members, which dues shall be collected by the Society, and the excess over non-resident dues paid over

in gross, when collected, to the Local Treasurer of such Association, for the use thereof.

4.—All papers and discussions presented before such Local Association shall be regarded and treated as to revision and publication as though presented before the Society, and, if accepted by the Publication Committee of the Society, shall be published under the same regulations, with such annual reports and extracts from the Association's official proceedings as may be proper matter of record.

5.—The title of all real and personal property acquired by or for such Associations shall be and remain with the American Society of Civil Engineers, in trust for the uses of such Association so long as it continues in existence. And should any such property be acquired in contravention of this section, by bequest or otherwise, the title thereto shall be transferred to the Society.

6.—No such Association shall assume to act or incur debt or obligation in the name of the American Society of Civil Engineers, nor shall any action on public questions be had by it, nor any agreements made between it and other organized bodies, without the previous approval and consent of the Board of Direction.

7.—If any independent engineering organization shall be dissolved with a view to the formation of Associations under this article, with an agreement to transfer the property of such organization to this Society, the Board of Direction may, in its discretion, for a limited period stated, waive the exaction of a part or all of the entrance fees and other dues or subscriptions provided for in favor of such members of said dissolved organization as may apply for admission to this Society, or it may refund any such fees or dues previously paid ; but all admissions to the Society as Member or Associate shall be by ballot after individual application, as provided in the Constitution.

An application for admission as Junior and a proposal for admission as Associate shall be presented to the Secretary of the Local Association existing at the nearest point to the residence of the person applying or proposed. It shall be referred to the proper committee, which shall make inquiries as to the candidate and shall report at a subsequent meeting of the Association. A ballot of those present shall then be taken and the candidate shall be declared elected unless one-fourth of the votes are in the negative.

8.—Each Local Association shall be designated by the name of the city or town at which it is established.

9.—Those connected with the Society, resident within 50 miles of New York, shall constitute the New York Local Association of the Society. The dues from such residents shall be paid into the general funds of the Society and be administered by its officers. Such portion of the resident dues as may be required for providing for the meetings and for the transaction of the business of this Local Association shall be so applied through the officers selected by that Association. The New York Local Association shall have the right to the use of the House of the Society for meetings. Should that Association so desire, its affairs may be managed by the officers of the Society.

Provide for only two great meetings of the Society and such special meetings as may be called. All other meetings will be of Local Associations.

PLAN B.

1.—Twelve or more Corporate Members residing within 50 miles of any city may organize and maintain a Branch Society, to be known as the ..... Branch of the American Society of Civil Engineers, under the provisions fol owing, and such supp ementary conditions as may be from time to time adopted by the Board of Direction. Such Branch Society may adopt a constitution and by-laws, elect officers, prescribe qualifications and classes of its members, and fix the dues to be paid by them; buy or lease and hold property in its own name, appoint and hold meetings, and do any other thing or things that may be necessary and proper to establish and maintain its usefulness and prosperity. Provided, that nothing shall be contained in its constitution and by-laws contrary or antagonistic to the Constitution and By-Laws of the Society, and that it shall be conducted in substantial harmony with the general policy and usages of the Society.

2.—When any such organization is made with the intent to become a Branch Society of the American Society of Civil Engineers, it shall make application to the Board of Direction for admission, and submit a copy of its Constitution and By-Laws therewith.

If, upon examination, the Board of Direction shall approve of the organization of such branch, and find that its Constitution and By-Laws are in conformity with the requirements of this Constitution, and that the conditions prescribed by the Board have been complied with, it shall issue to the said organization, official license and authority to become, and be, a Branch Society of the American Society of Civil Engineers; and such license shall not thereafter be revoked without the approval of two-thirds of the Corporate Members of the Society, expressed by lettter-ballot.

3.—Persons elected to membership in such Branch Society, who are not at the time of such election members in some class of the American Society of Civil Engineers, shall thereby become, with the approval of the Board of Direction, and upon the payment of the prescribed fees and dues to the Society, subscribers of the American Society of Civil Engineers, but without such approval, the election to membership in the Branch shall be void.

Elections or transfers from the membership of such Branch to membership in the several classes of the American Society of Civil Engineers, other than the class of subscribers, shall be in the manner and follow the course prescribed in Article III, Codified Constitution.

4.—Members may be expelled from such Branch in conformity with the requirements of its constitution and by-laws, and with the approval of the Board of Direction of the Society, but such expulsion shall not extinguish the membership of the person so expelled in the American Society of Civil Engineers, except in the case of subscribers. Expulsion by the American Society of Civil Engineers shall also extinguish the membership of the person expelled in such Branch Society.

5.—No person shall be a member of two such Branch Societies at the same time. A member removing permanently from any one Branch Society to within the limits of another, may have his membership transferred thereto by the proper authority of the first, and the acceptance of the second Branch. A member of any one Branch who may be temporarily residing within the limits of another Branch, shall be entitled to all the privileges of that Branch, except that of voting.

6.—No such Branch Society shall have authority to act in the name of the American Society of Civil Engineers, nor to take any action

antagonistic to the practice or policy of that Society; nor to take any official action on questions not relating to the management of its local affairs, without first obtaining the approval thereof of the Board of Direction.

7.—Papers and discussions read before or presented to such Branch, shall belong to the American Society of Civil Engineers, and shall be forwarded to the Secretary as soon as possible after being so read or presented.

The printing and publication of such paper and dissussions, as well as of the proceedings of the meetings of such Branch, shall be subject to the same rules and conditions as the papers and proceedings of the Society.

8.—Each Branch Society so established, shall have the right to be represented on the Board of Direction by one member, who shall be elected from among Corporate Members of the Society, at the last meeting of the Branch Society preceding the Annual Meeting of the Society. Such representative shall have all the rights and privileges of other Members of the Board of Direction, except that of voting.

Each Branch may also designate one Corporate Member at its last meeting preceding the Annual Convention, who shall be a member of the Nominating Committee.

9.—Any Engineer's Club or Society already organized, and having among its membership twelve or more Corporate Members of the American Society of Civil Engineers, may be admitted as a Branch Society of the American Society of Civil Engineers in the same manner as new organizations, by complying with the requirements of preceding sections of this article.

10.—No Branch Society shall be authorized by the Board of Direction within a radius of fifty miles from a town or city where such a Branch already exists.

PLAN C.

I.—Upon the application of members desiring to organize branches of the American Society of Civil Engineers, the Board of Direction may authorize the same at points where in its judgment the membership is sufficiently large to warrant a local organization.

II.—Such branches, whose membership shall be limited to the various grades of members of the American Society of Civil Engineers, may adopt constitutions, elect officers, fix the local dues to be paid by their members, buy or lease property in their own names, appoint and hold meetings, establish libraries and reading-rooms, and do such other things as may be deemed necessary to promote their usefulness which may be not inconsistent with the general policy of the Society, or repugnant to the Constitution, as may be determined by the Board of Direction. But such branches shall take no action and incur no liability in the name of the Society.

III.—Advance copies of papers presented to the Society shall be sent to each Branch for discussion, and each Branch shall send an advance copy of every paper presented to or read before it to the Secretary of the Society for presentation to the Society, and for distribution to the other branches. Copies of all written discussions shall also be forwarded to the Secretary. Such papers and discussions shall be considered as though had before the Society.

IV.—The Board of Direction is authorized to formulate from time

to time the necessary rules for carrying into effect the provisions of this Article.

RELATIONS WITH KINDRED SCIENTIFIC BODIES.

I.—The Board of Direction may, whenever it deems it proper and suitable, enter into relations with other scientific or professional societies with a view of exchanging papers and discussions.

II.—After the establishment of such relations, the Board of Direction may authorize the issue of the Transactions and separate papers to these societies in such quantities as they may desire at favorable rates, or in exchange of corresponding publications of said societies.

PLAN D.

I.—Branches of the American Society of Civil Engineers may be authorized by the Board of Direction at points where in its judgment the membership is sufficiently large to warrant a local organization.

II.—The sole object of authorizing the establishment of such branches, so far as the American Society of Civil Engineers is concerned or involved, is to encourage and to facilitate the presentation and discussion of papers, with the consequent promotion of social and professional intercourse among neighboring members and others enjoying a community of interests with them.

III.—Branches may make their own rules and regulations regarding organization, membership, and proceedings, but the name of the Society shall be used only as authorized by its Constitution and By-Laws. Membership in a Branch does not of itself constitute membership of any class in the American Society of Civil Engineers.

IV.—Advance copies of papers presented to the Society shall be sent to each Branch for discussion, and each Branch shall send an advance copy of every paper presented to or read before it to the Secretary of the Society for presentation to the Society, and for distribution to other branches. Copies of all discussions shall also be forwarded to the Secretary. Such papers and discussions shall be considered as though had before the Society.

V.—Branches shall be supplied with any number of copies of papers and their discussion, upon the same conditions as they are now furnished to members of the Society. Should any Branch desire to be supplied with complete copies of the Transactions, the Board of Direction is authorized to fix an equitable rate of subscription for the same.

VI.—An existing local engineering Society may become a Branch of the American Society of Civil Engineers, provided it come within the conditions of Section 1 of this Article.

VII.—The Board of Direction is authorized to formulate from time to time the necessary rules for carrying into effect the provisions of this Article.

VIII.—The Board of Direction may at any time by a two-third vote of all its members dissolve any Branch, so far as its relations with the Society are concerned. No such vote, however, shall be valid, unless it include a majority vote of all the non-resident members of the Board.

PLAN E.

Suggestion of one of the Local Associations.

The idea of affiliation seems to be founded upon the wish to extend the influence and usefulness of the American Society of Civil Engineers and to secure more contributions to their literature by causing the publication of papers read before local societies by members of the American Society.

This affiliation is proposed to be brought about by absorbing the local societies under certain restrictions, as branches or chapters of the American Society.

The American Society, as it stands now, is a highly useful, important and representative organization, and can continue as such only so long as it maintains its high standard of membership and holds fast the individual interests of its members. It cannot afford to even loan the use of its name to societies embracing persons who would not be eligible to membership in the American Society.

While the loan of the name could be avoided by merely arranging that local societies be placed upon an accepted list and provision made that papers read by a member of the American Society should be published in full, and with the discussion by members of the local society, in the Transactions of the American Society; but, the adoption of this suggestion would, however, probably destroy the Journal of the Association of Engineering Societies, and make more difficult the publication of many meritorious papers written by engineers not members of the American Society. The existence of the Journal is an incentive to the young engineer to submit a worthy article, and we cannot afford to lose its help.

The prosperity of either society or club must, in the end, depend chiefly on merit rather than mass.

To add to the American Society, *even partially*, a lot of half-fledged members who will take little interest in its proceedings, beyond giving weight of numbers, or, we might say, brute force, could scarcely be other than detrimental.

Again, to deprive local clubs of independence, and in any way subordinate them to the American Society, would hardly be productive of good results.

We know, of our own experience, that we can belong to many organizations and still maintain a lively and useful interest in each; but, let them be consolidated into one gigantic body, our interest in the *one* is not necessarily the sum of our concern in all the original societies; it is more likely to diminish to the interest which we previously held in but one of the former.

We believe that the work to be done by the several societies is sufficiently broad and varied to give ample scope to separate organizations. Matters of universal or national importance will naturally go to the American Society, even if they are originally presented to some local society. The local societies can better attend to matters of local interest and such as pertain to the good fellowship of the profession.

To burden the American Society with any matters of local interest would be unfortunate, while to deprive local societies of their home influence would be equally unfortunate.

There have been received in reply to this circular ten communications from the representatives of as many local societies, of which the following are those which express decided opinions or suggest definite plans for carrying out the proposition before the committee:

[From the Boston Society of Civil Engineers.]

BOSTON, May 22d, 1890.

WILLIAM P. SHINN, Esq.,

Chairman Committee on Revision of Constitution and By-Laws,

AMERICAN SOCIETY OF CIVIL ENGINEERS,

127 East 23d street, New York, N. Y.

DEAR SIR,—In reply to your esteemed favor of March 26th, we, a committee of the Boston Society of Civil Engineers, have to confirm what we wrote you 11th October last. We may add in reference to the plans which you are so good as to send us that plan "D" is the one that seems to us best adapted to meet the views of the Boston Society of Civil Engineers. The leading objects which we hope to attain by the establishment of relations between societies are to afford opportunities for the members of different societies to discuss each other's papers and projects, attend each other's meetings and excursions, and have access to each other's rooms and libraries, with equitable adjustment, of course, of expenses. Plan D explicitly states its purpose to be to promote the presentation and discussion of papers and by consequence social and professional intercourse. If the American Society of Civil Engineers and the local societies with which the Boston Society of Civil Engineers is now associated in the Association of Engineering Societies shall unite in favoring plan D, with perhaps some little modification of its details, we have no doubt that the Boston Society of Civil Engineers will gladly cast in its lot with the rest. That is to say, we think the American Society of Civil Engineers might decide that the Boston Society of Civil Engineers, with its own name, charter, constitution, by-laws, library, money in treasury, etc., was acceptable as a Branch, and was to be included in the system of exchanges provided for in plan D so long as the two societies should see fit mutually to continue the relation.

We notice that plans A, B and C provide somewhat similarly to plan D for the transmission of papers and discussions, but go further and add various provisions for organic connection to be made by changes of constitution of the societies. After the exchange of papers contemplated by plan D shall have led to better acquaintance and have augmented the feeling of relationship between the members of the American Society of Civil Engineers and the Boston Society of Civil Engineers, perhaps some organic union will naturally be effected. Whether such organic relations should now be entered into between the American Society of Civil Engineers and other societies, while the Boston Society of Civil Engineers remains connected only by plan D, or some equivalent, we do not feel called upon to discuss.

We regret that it will not be convenient for us to meet you in New York on June 4th.

Cordially yours,

FRED. BROOKS,
DWIGHT PORTER,
SIDNEY SMITH,
Committee.

[From the Engineers' Society of Western Pennsylvania.]

GENTLEMEN,—Your Committee appointed to confer with the American Society of Civil Engineers, with a view to establishing a closer relationship between the various engineering associations of the United States, respectfully submit the following report:

A considerable number of engineering societies now exist in the different States, each possessing local peculiarities and satisfying local wants. Being organized to accomplish different aims under different circumstances, they possess a vitality and an individuality, and therefore a value, which could not be increased by any other single plan of organization known to your Committee.

For any one society to attempt to form a "protectorate" over these associations or to turn them into "branches," governed by the same rules, would be, in our opinion, either unsuccessful or disastrous, as tending to check their natural birth and development.

We fully recognize the unfortunate fact that the isolation of these local societies is a direct loss to the engineering profession and to the country; whereas their successful co-operation would ultimately give an incalculable impetus to the engineering progress of the United States and of the world.

Engineering, in its various branches, is perhaps the most powerful factor in the material progress of this country; and yet engineers, as a body, have very little influence in national or state legislation, however worthy the object may be, principally because they lack the power due to concentrated aims and efforts.

The American Society deserves credit for attempting to increase its own usefulness and that of other engineering bodies throughout the United States; and in view of the foregoing remarks, we would suggest the following general plan in reply to the inquiries of their Committee:

First.—That the American Society and other engineering associations of the country form a Federation which shall leave to each society its autonomy and individuality.

Second.—This Federation to be governed by a council whose members shall be delegates from the constituent societies, chosen on a basis of numerical membership; but each society to have at least one representative.

Third.—This Federative Council to possess power delegated to it from time to time by the societies; such, for example, as the selection of local papers for its Transactions; the determination of conditions of transfer of a member from one society to another; the interchange of published Transactions; and the investigation and discussion of subjects of national importance.

The President and Secretary of the American Society might occupy similar positions in the Council, whose place of meeting at stated periods would naturally be New York.

By means of such a Federation, the American Society would preserve its present high standard of membership while gaining many new members and additional influence, as the acknowledged head of a powerful, active and extremely useful Federation of engineering societies of the United States.

W. L. SCAIFE,
THOMAS P. ROBERTS,
JOHN W. LANGLEY,
Committee.

PITTSBURGH, May 20th, 1890.

[From the Western Society of Engineers, Chicago, Ill.]

CHICAGO, May 29th, 1890.

W. P. SHINN, Esq.,
Chairman Committee on Revision of Constitution and By-Laws,
AMERICAN SOCIETY OF CIVIL ENGINEERS.

DEAR SIR,—The Committee appointed by the Western Society of Engineers to confer with your Committee with a view of determining whether a satisfactory basis can be established for an affiliation with the American Soc ety of Engineers, begs to submit the following views, in accordance with your request, as contained in your circular of March 26th, 1890.

Engineers are generally agreed that it is most desirable that there should be a close union and co-operation between all the members of the profession in this country, as well as of the individual engineering societies. In no other way can concert of action be so well obtained to elevate the acquirements and position of engineers. The main difficulty in the way hitherto has been the lack of some adequate plan of bringing about that union which gives strength.

In this respect the five suggestions appended to your circular seem to us scarcely complete enough to be discussed individually, but they may be divided into two classes.

First.—Affiliation plans, A, B and C.

Second.—Federative plan, D.

The preference of our Committee is for some form of organization which will afford the advantages both of affiliation and federation, and which will build up one strong homogeneous society, open to all the members of the profession, under their appropriate grades, provided that this can be organized so as to recognize in some way all the existing local societies and their membership, and preserve the autonomy of the societies, and foster the local meetings which have been found so valuable as to lead to the increasing organization of engineer's clubs, even where the members were already connected with the American Society of Civil Engineers.

We believe, therefore, that any affiliation plan must in the main provide features embodied in the accompanying "Suggestions for a General Organization of Engineers." For the American Society to accomplish this it would be necessary :

1. To continue the present members of the local societies in connection with the reorganization, under appropriate grades.
2. Local meetings and self-government of each Branch so far as this casts no responsibility upon the general organization.
3. Representation of each Branch in the general Board of Direction.
4. That the Board of Direction shall be representative of the several units composing the organization.

Should these features be deemed objectionable, there will remain the alternative of some loose federation for the reading, discussion and printing of papers, such as that outlined in plan D, but even this will need elaboration and eventual discussion in some joint committee meeting of all the societies interested.

Respectfully submitted,

BENEZETTE WILLIAMS, H. B. HERR,
A. GOTTLEIB, A. T. NAGLE,
O. CHANUTE,
per L. E. Cooley. *Committee.*

Suggestions for a General Organization of Engineers.

A. The ultimate purposes for which engineering associations should be founded seem to be:

1. Social fellowship, exchange of professional experience and the fostering of brotherly relations by union in a common body of all members of the engineering profession, and those entrusted with the management or carrying out of engineering enterprises.

2. The preparation and publication of original engineering experiences and special investigations of technical interest, and of "contributions to knowledge," on subjects recognized as important, but for which the demand is too limited to justify cost of commercial publication, and to embrace all current literature by abstract or index in one publication.

3. To encourage and secure through individual, corporate, and governmental agencies, the systematic valuation of all the "forces and materials of nature" with which problems of engineering are concerned.

4. To influence and direct public and legislative opinion in matters of policy concerning those public works in which the engineer is better fitted to give advice than any other class of citizen.

A place of resort for engineers in every center of population where they may meet each other, discuss current topics and entertain those in related fields, is recognized as of prime importance.

At meetings of local bodies, technical contributions are important, but if worthy furnish little material for discussion. They are matters for individual reading and criticism and careful thought. Discussion of such contributions in public assemblage does not enlist interest or secure attendance.

Experience shows that the profession is interested in the settlement of controversial questions which present true issues, and matters of public policy related to public works.

There are also broad questions of general concern, and a large field of common purpose, which concerns the profession as a whole; but the nature of these more general questions does not call for frequent meetings, nor are frequent meetings practicable for a national organization. The detailed formation of opinion is best accomplished through smaller bodies than such an organization.

The general organization should in no way be restrictive, but may be suggestive to the local organizations, as the initiation of action important to the profession, and the carrying out of the same must be mainly discretionary with the local bodies, leaving to the central body largely the co-ordination of effort.

B. The following general plan therefore follows:

1. An organization of all branches of the profession in one association, the general membership to be attached to local bodies when within certain distances of such bodies, the local bodies to have other membership purely local, or that have all privileges with the right to vote restricted to the local organization.

2. Each local body shall be organized under the same constitutional form, but may have by-laws to meet local needs, provided they do not conflict with the general by-laws of the association.

3. The general governing body shall be drawn from the general membership, but shall in part be elected by and be representative of the several local bodies composing the organization.

4. The governing body shall work strictly within the lines of its constitutional authority, and may pass by-laws for general purposes,

but all amendments to constitution, or grants of authority must be ratified by the local bodies.

5. General meetings of the governing body and of the general membership may be held annually or semi-annually.

C. As a first step to bring about a federation which shall grow into a constitutional union, it is suggested:

That each society appoint delegates, one for each fifty members, to attend a convention; to draft provisional articles of federation; and that such provisional articles of federation be submitted to each society represented for ratification; and that upon the ratification by two-thirds of the societies participating, the federation shall enter upon its existence.

It may be observed that grave doubts are entertained as to the possibility of founding an organization patterned after those existing abroad, not only from the vast extent of this country and the diversified interests of various sections, but also on account of the political and social ideas, characteristic of the American people. Any general organization for the United States must respect the political habits and tendencies of the people and follow the logical growth of American institutions.

[From the Engineers' Club of St. Louis.]

ST. LOUIS, April 16th, 1890.

To the St. Louis Engineers' Club:

Your Special Committee on the Affiliation of Engineer Societies considers that the subject of a closer affiliation has now been sufficiently discussed to justify us in submitting, for your consideration, the outlines of a plan which seems to us to approach the practicable.

In explanation, it seems necessary to say, that your Committee does not consider it either practicable, or desirable, to establish an organization to embrace all persons who are engaged in pursuits related to engineering, nor such as pursue scientific research other than as means to practical ends. We further think that, of those properly called engineers, a more or less complete segration according to special or local interests, is both natural and proper.

The existing national societies of civil, mining, mechanical and electrical engineers have come into existence because their promoters felt a want not fully met by the liberal constitutional provision of the first-named society, by which all of these several classes are eligible to membership. This shows that persons pursuing like lines of work desire to get together by themselves, at least occasionally. The local organizations find the reasons for their existence in the gain, social and professional, which comes from contact between persons whose pursuits have something in common, but which do not run parallel. No proposition which looks to the abandonment of either of these two classes of organization, or which will hinder their growth, is worthy of consideration. The question is: Can they be brought into a closer relationship that will facilitate objects common to all?

Your Committee thinks that the term civil engineer is one which embraces all classes of engineers, except those engaged in strictly military works. The American Society of Civil Engineers, which is the oldest of its class in this country, and has retained in its constitution the catholic tradition of its name, is the best nucleus for a general organization. This society has the further advantage of having in its membership already representatives of all classes of engineers. We

therefore, in outlining a plan of co-operation, assume the American Society of Civil Engineers as the center.

Probably the American Institute of Mining Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers will prefer to maintain a separate position as now. The most that can be looked for is co-operation in the matters of headquarters, offices, building, library and publications.

Of necessity local organizations must be allowed freedom in the management of their own affairs, particularly as to property acquired, dues and conditions of membership.

We propose as an outline of a scheme:

1. To confer upon any body or organization of engineers, one-fifth of whose members are connected with the American Society of Civil Engineers (provided said number shall not be less than ten), the privilege of publishing its papers with those of the American Society, and of becoming, in a certain restricted sense, a branch, or chapter, of that society, conditioned only upon the adoption of constitutions and by-laws in harmony with those of the American Society of Civil Engineers, and the observance of certain stipulations.

2. Such bodies to be independent of each other, being represented in the Central Society, indirectly only, by such of their number as are also members of the American Society of Civil Engineers. They shall be self-governing in all matters pertaining to the local membership, dues and expenditures other than a subscription to the publications of the American Society of Civil Engineers, at rates fixed to cover the cost of publication and a reasonable proportion of general expenses, which subscription shall be collected by the local body and paid into the American Society treasury annually in advance, or substantially the same as is now done through the Association of Engineer Societies.

3. Professional papers submitted to the branches, and other suitable matter, shall be published by the American Society, under the same rules and restrictions as are provided for like matter originating in the American Society.

4. As the presentation of papers in either of the affiliated clubs would be a virtual presentation to the American Society, the semi-monthly meetings of the members of the Society resident in New York would be in effect meetings of a local section only, with no greater importance than is given them by the number and character of those in attendance. It would, in fact, be well to provide that the American Society as such should hold but two meetings in each year, one of them to be held in the City of New York, and the other at any other place which may be selected. At these meetings all business affecting the general interests of the Society should be transacted, whilst all routine business should be conducted by an enlarged Board of Directors.

To make more definite the steps to be taken to bring about the proposed union of publications, we suggest the following as the form of a constitutional provision to be adopted by the American Society.

ARTICLE.....

Any professional society or organization of engineers now or hereafter formed, may become associated with the Society for the publication of professional papers upon the following terms and conditions:

A. Such association must consist of not less than twenty-five persons, not under twenty-five years of age, who are eligible as members, asso-

ciates or juniors of this Society, and of whom not less than ten shall be, or become, members or associates thereof.

B. Such association must have completed its organization, by the adoption of a name, which shall not contain the corporate name of this Society; by the adoption of a proper constitution and by-laws; by fixing the conditions of its membership; and by electing the necessary officers.

C. Such association, being thus duly organized, shall then make formal application to this Society for admission as an associated club or branch thereof, inclosing with its application a list of its members, a copy of its constitution and by-laws, an agreement to conform to the conditions imposed by the constitution and by-laws of this Society upon the branches, and other information necessary to identify the body seeking admission.

D. Applications so received shall be submitted to a letter-ballot of this Society, and if receiving a majority of votes cast shall be granted.

E. When notified by the Secretary that the application has been granted, the petitioning body must formally accept, and certify such acceptance by the signature of its presiding officer and secretary, within six months after the date of the notice, otherwise all proceedings shall be deemed to have lapsed.

F. Every organization associated with this Society, in accordance with the foregoing provisions, must have continuously in its membership not less than ten members or associates of this Society; nor shall the number of such members, associates and juniors, be less than one-fifth of the membership of the Branch at any time after one year subsequent to the date of its admission as a Branch; it must be responsible to this Society for all monies due for subscriptions for the publications of the Society; and must subscribe for at least one copy of the Transactions for each of its members who is not also a member of this Society in some class. No professional papers shall be published under the name of a Branch, except through this Society.

G. Any organization having associated itself with the Society under the preceding provisions may withdraw from such connection by discharging its obligation in full and giving notice to the Secretary of this Society of its purpose to withdraw; or for the failure of the associated club to comply with its obligations to this Society, its connection therewith may be dissolved by the Board of Direction by a two-thirds vote, provided that after notice from the Board of Direction of its default, the said club shall for three months fail to remedy its default.

ROBT. MOORE,
ROBERT E. MCMATH,
JAMES A. SEDDON,
Committee.

[From the Engineering Association of the Southwest.]

REPORT OF THE EXECUTIVE COMMITTEE ON THE CIRCULAR-LETTER RECEIVED FROM THE AMERICAN SOCIETY OF CIVIL ENGINEERS.

To the Engineering Association of the Southwest:

GENTLEMEN,—The Executive Committee, to whom was referred, at the regular meeting on April 11th, the matter of affiliation of the American Society of Civil Engineers, as represented by a circular-letter dated March 6th, 1890, addressed to this Association by Mr. William P. Shinn, Chairman of the Special Committee on Affiliation of Local Engineering

Organizations with the American Society, beg leave to report the following as its views and recommendations on the subject and to preface them with a few general remarks relating to what we conceive to be the true relation existing between engineering organizations.

Even a casual analysis of the functions of engineering as well as of other similar organizations will show that such functions are naturally divisible into three quite distinct classes.

1. Those of a purely general nature, neither limited as to geographical locality nor as to professional specialties, such, for example, as questions relating to the ethics of the engineering profession, the relation of engineers to public works of the Government, the status of engineers as experts before the courts, the education and training of engineers, etc.

2. Those functions of a purely special character which are limited in their bearing to some one or more subdivision of the profession but are not limited as to locality; for example, the question as to the most economical type of bridge truss, the compounding of locomotive engines, the separate *vs.* the combined system of sewerage, etc.

3. Those functions that are largely local in their character, though not limited to any one particular branch of the profession, and which concern questions whose local significance is paramount to their general interest, and paramount to their relation to any one particular branch of the profession; for example, the improvement of the transfer facilities of the East River Bridge, the taxation of engineers in Tennessee, the highway laws of New Jersey, the improvement of the Cumberland River, etc.

We are of the opinion that a due consideration of the above important distinctions should be had in view in any form of reorganization of our existing engineering societies, and that the general welfare of the profession in the United States demands that each of the three above classes of functions be rationally and systematically provided for in our engineering organizations.

We are further of the opinion that the two first of the above three classes of functions can be provided for by one national organization, which shall possess a dual character, namely, 1st, that of a single homogeneous organization to be assumed when acting on questions falling under the first class; and 2d, that of a federation of distinct special organizations, each one of which would properly deal with questions of the second class, namely, those belonging to some special branch of the profession. A true parallel to the above proposed form of organization now exists in the American Association for the Advancement of Science, which acts as a unit on matters of general scientific interest, but subdivides itself into sections for consideration of questions of special interest to any one particular branch of science; as, for example, its sections of physics, chemistry, geology, botany, etc.

We would respectfully suggest to the American Society of Civil Engineers the advisability of considering whether or not the above proposed federation may not be brought about by an affiliation between that body and the other present existing national organizations, namely, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, the American Institute of Architects, the American Institute of Electrical Engineers, into one federation, in which each originally distinct organization shall retain, in the main, its distinctive character and distinct government, modifying only such of the present features as should be found necessary to insure that uniformity and symmetry needed for successful co-operation.

Such a federation, with the functions and scope of the general body, and of its several subdivisions properly and clearly established and correlated; with its qualifications for membership so high as to be a guarantee of professional ability, and still so adjusted as to preserve its representative character; with its several sections occupying the same building; building up a library in common; issuing in common a journal containing the transactions of its several sections; would, we believe, be in a position to handle with authority, with dignity and with promptness all matters which fall in the two first classes above mentioned, and would do so with greater thoroughness and efficiency than is possible under the present isolated condition of the several national societies. As to the name of the above proposed federation, while a matter of secondary importance, we believe that, as a separation in the near future of the military from the purely civilian engineering work of the government is likely to be accomplished, we see no reason why the term Civil Engineer should not be restored to its original meaning as a general term, including the branches of mechanical, mining, electrical, hydraulic, railroad and sanitary engineering, in fact covering all branches of engineering of a civil nature, and being, therefore, distinguished only from naval and military engineering. Following this idea we see no reason why the term American Association of Civil Engineers might not properly be applied to the above federation of engineering societies.

Regarding the third class of functions above enumerated, namely, those which are largely local in their character, though not limited to any one particular branch of the profession, we are of the opinion that since the nature of these functions must be subject to local conditions and surrounding circumstances which may not exist in other localities, that it is extremely desirable that these functions be provided for by purely local organizations, wholly independent in their government, managing their own financial affairs, holding their own property and establishing their own qualifications as to membership. Their prosperty will, therefore, depend entirely upon the skill and judgment with which their affairs are managed and the incentive to proper energy and care will thus be much greater than if responsible to higher authority. We believe, however, that a certain affiliation and co-operation between such organizations is wholly feasible and desirable. Such affiliation, we think, however, should be limited to features of the following general nature: Provisions for transmitting to the national organization all matters, questions and papers which fall properly within the first two of the above-mentioned classes; provisions for a suitable exchange of papers and periodicals; provisions for mutual courtesies extended to members and visitors, and for a system of personal representation by which accredited members of local organizations would be admitted to the meetings of the national organization—whether members thereof or not—and have all privileges at such meetings (except that of voting), and by which provision also accredited members of the national organization should likewise attend meetings of the local organizations with similar privileges; and in general all provisions which will tend to promote and advance one of the important objects of all organizations, namely, the maintenance of that perfect harmony and unity of purpose which can only exist where the fullest understanding of purpose, and where an intimate acquaintance and *esprit de corps* throughout the profession exists.

The above is respectfully submitted for consideration by the Association, and when amended for adoption by the Association, as its

reply to the circular letter of March 26th, received from the Special Committee of the American Society.

JOHN MACLEOD,
W. F. FOSTER,
W. C. SMITH,
WM. L. DUDLEY,
OLIN H. LANDRETH,
Executive Committee.

May 6th, 1890.

The above report, after due consideration, was unanimously adopted by the Association.

OLIN H. LANDRETH,
Secretary.

[From the Engineers' Club of Cleveland.]

CIVIL ENGINEERS CLUB OF CLEVELAND, OHIO.

It is not thought by the Committee advisable at the present time to formulate any plan or express any views looking towards closer relations with the American Society. While we will always be glad to receive and carefully consider any proposition that the American Society would wish to make us having this object in view, still we feel that each organization has important and honorable work to do in independent and separate fields; and no plan that has been proposed or that we can suggest, seems entirely free from objection; and we fear a closer affiliation on any of the plans presented would interfere with the separate work of the organizations to the detriment of all.

In view of the fact that there is a movement on foot for a general combination of all the engineering societies, a closer alliance with the American Society of Civil Engineers only, at this time, might embarass us in the future.

Your Committee would therefore recommend that a representative meet the Committee of the American Society, as requested by Mr. Shinn, and while expressing the views herein set forth, cordially unite with it in discussing any plans presented, and submit any favored one to the Club for its consideration.

AUG. MORDECAI,
JOHN WHITELAND,
J. F. HOLLOWAY,
HENRY C. THOMPSON.

[From the Rensselaer Society of Civil Engineers.]

The Committee of the American Society of Civil Engineers,
Mr. WILLIAM P. SHINN, Chairman.

GENTLEMEN,—At the request of your Committee some months since, we were appointed a committee from the Rensselaer Society of Civil Engineers, of Troy, N. Y., to confer with you on the matter of affiliation, and have by correspondence among ourselves and by personal conferences, given the matter a very careful and detailed consideration, prompted by our desire, if possible, to make suggestions advantageous to both the American Society of Civil Engineers and the Troy Society.

After the most careful reflection, and examination of the question involved, we are unanimous in the opinion that affiliation with the

American Society on any of the bases A, B, C, D and E, mentioned in your circular, or on any similar one, is not practicable, or we may even say desirable, either on the part of the Rensselaer Society of Civil Engineers or of the American Society of Civil Engineers.

This conclusion results from the characteristic features of the organization of the former Society and from the further fact that its members are scattered all over this country, and hence any limitations which it would be necessary to prescribe with regard to locality in connection with the plans in your circular would be impracticable. We are prepared to give a number of very cogent reasons for this conclusion, which we will gladly communicate to you, if you desire, but with which we think it will be unnecessary now to burden your attention.

We think, however, that a very simple plan of affiliation, easily workable and with very considerable resulting benefits to both societies, may be consummated. This plan consists as follows, namely:

Members of the Rensselaer Society of Engineers who have graduated from the Rensselaer Polytechnic Institute and received the degree of C. E., and followed that profession in any of its branches for the period of one year, shall become Juniors of the American Society of Civil Engineers on their own application, subsequently approved by a majority vote of the Board of Direction.

It has appeared to us that this simple plan may be put into active operation without entailing in any way any result disadvantageous to the American Society of Civil Engineers, and in many respects be of material advantage to it. The standard of admission to Junior membership, the only grade to which this plan would apply, would stand precisely as it is, not affected in any way whatever, and hence the standard of admission to any other grade of membership would remain unchanged; nor again would there be any obstacle in the way of raising the standard of admission to the American Society in any of its grades, should it be found desirable to do so hereafter. We will also state in this connection, and are able to support our statements by statistical evidence, which we shall be glad to produce, that the aim of the Rensselaer Society of Engineers has always been to accept as members only those students of the Rensselaer Polytechnic Institute of high standard in scholarship, and hence the grade of Junior membership of the American Society would receive by this plan an influx of most desirable young engineers. The standing of the Rensselaer Polytechnic Institute as a school of civil engineering is certainly second to no other in this country, to say the least, and we think we may confidently say that all candidates received into the American Society through this source would elevate its general professional character and result in the highest degree to the welfare of its best interests.

We trust, therefore, that you will give a favorable consideration to this communication. We should be glad to furnish in this connection any further communication or evidence bearing upon the matters in consideration at any time.

Very respectfully submitted,

GEORGE A. JUST,
WILLIAM H. BREITHAUPT,
WILLIAM H. BURR,
Committee of R. S. E.

Replies were also received from the Technical Society of the Pacific Coast, the Iowa Civil Engineers and Surveyors' Society and the North-

west Society of Civil Engineers and Architects at Portland, Ore., which, however, contained no action or suggestion by those societies.

The Committee submits the foregoing for the information of the Society at large in the belief that it will tend greatly to simplify the views of the members upon the important subject referred to therein.

It will be seen that the Committee has made every reasonable effort and has offered every possible opportunity for the expression of the views of the representatives of local societies upon the subject of affiliation with the Society. It was the expectation of the Committee that at their meeting on June 4th, they would be met by the representatives of a number of the local societies, and that some personal discussion of the plans suggested would have taken place. The Committee regrets, however, to be compelled to record the fact that it was met by representatives of only two societies, who merely handed in their reports without any verbal discussion. Whether this result may be due to lack of interest in the subject, or whether, on the contrary, it may be attributed to a recognition of the difficulties inherent in any plan of affiliation, your Committee is unable, at this time, to definitely state; but your Committee is impressed with the idea that when the attempt is made to formulate a plan for such affiliation the obstacles which arise in the details make it extremely difficult to reach a definite conclusion.

Your Committee found it impossible to set an earlier date than June 4th for a hearing of the representatives of the local societies, in order to give ample time for consideration of the subject by the local societies, and were therefore unable to report upon the general subject committed to their charge in time for action by the Convention, and your Committee therefore submits this report of progress and asks to be continued.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
BAYLISS, RAWLINSON TENNANT	Manager The Montana Co., Marysville, Mont	June 4, 1890
EDWARDS, HARRY WINTER	Division Engineer Great Northern Ry., St. Paul, Minn	June 4, 1890
GREINER, JOHN EDWIN	Assistant Engineer Baltimore and Ohio R. R., Baltimore, Md	June 4, 1890
GRIMM, CARL ROBERT	New Jersey Steel and Iron Co., Trenton, N. J	June 4, 1890
HILGARD, KARL EMIL	227 Main st., Cincinnati, Ohio	June 4, 1890
HODGES, GILBERT	19 Exchange pl., Boston, Mass.	June 4, 1890
HOPKINS, CHARLES COMSTOCK	Rome, N. Y	June 4, 1890
JOHNSTON, ANDREW LANGSTAFF	1105 E. Main st., Richmond, Va.	June 4, 1890
MARVIN, CHARLES EYRA	Road Master Georgia Central R. R., Macon, Ga	J. July 1, 1885 M. June 4, 1890
WALTON, CHARLES WALLACE	44 Buhl Block, Detroit, Mich.	June 4, 1890
WOODFORD, ETHELBERT GEORGE	P. O. Box 297, Pretoria, South African Republic	June 4, 1890

JUNIORS.

PARISH, WAINWRIGHT	Assistant Engineer Delaware and Hudson Canal Co., Albany, N. Y	June 4, 1890
ROEHM, GEORGE EDWARD	Bridge Dept. Michigan Central R. R., Detroit, Mich	June 4, 1890
SISSON, WILLIAM LEE	Assistant to Chief Engineer C., A. and C. Ry., Gann, Ohio	June 4, 1890
SMITH, CHARLES HORTON	Assistant Engineer New York, Ont. and Western R. R., Middletown, N. Y	June 4, 1890

CHANGES AND CORRECTIONS.

ALDRICH, JAMES C.....Chopmist P. O., Providence Co., R. I.
ALLEN, KENNETH.....3132 Campbell st., Kansas City, Mo.
BELL, HENRY P.....Valdivia, Chili, South America.
COBB, R. L.....Engineer Louisville and Nashville R. R., Clarksville, Tenn.
CUNNINGHAM, JAMES H.....4 Magdala Cresent, Edinburgh, Scotland.
DODGE, J. T.....1818 Broadway, West Superior, Wis.
DONOVAN, JOHN J.....Chief Engineer Fairhaven and Southern R. R., Fairhaven, Wash.

FIESER, L. F.....Engineer Dept. New York, New Haven and Hartford R. R.; New Haven, Conn.
FLAD, HENRY.....3400 Franklin ave., St. Louis, Mo.
GILLHAM, ROBERT.....Rialto Bldg., Kansas City, Mo.
GOLAY, PHILIP.....Assistant U. S. Engineer, Morgantown, W. Va.
GOULD, WILLIAM T.....(Care Frank Bartlet, Asst. Eng. N. P. R. R.), Palmer, Wash.
HARDING, HENRY.....Bridgeport, Conn.
HARISON, R. MORLEY.....228 West Regent st., Glasgow, Scotland.
HENNY, D. C.. .....Essex Bldg., Room 24, Denver, Colo.
HOLBROOK, F. W. D.....P. O. Box 194, Seattle, Wash.
KENNEDY, WILLIAM H.....Principal Assistant Engineer Union Pacific Ry., Portland, Ore.
KIMBALL, FRANCIS W.....Manager of Construction Chicago, Milwaukee and St. Paul Ry., Austin, Minn.
KINNEY, EDWARD C.....Anaconda Smelting Co., Anaconda, Mont.
LINVILLE, J. H.....140 S. Maryland ave., Atlantic City, N. J.
LUNDIE, JOHN.....1105 The Rookery, Chicago, Ill.
MCDONALD, HUNTER.....Engineer in charge Tennessee and Coosa Extension N. C. and St. L. Ry., Huntsville, Ala.
MINTURN, R. R.....Superintendent Iowa and Minn. Div., Chicago, Milwaukee and St. Paul R. R., Minneapolis, Minn.
MITCHELL, HENRY.....Nantucket, Mass.
OWEN, FREDERICK N.....58 West 91st st., New York City.
PARKHURST, HENRY W.....1415 N. Park Place, St. Louis, Mo.
PARTRIDGE, JOHN A.....511 6th st., N. W., Washington, D. C.
*PEW, ARTHUR.....Talbotton, Ga.
POTT, JOHN N.....Post Office Bldg., Philadelphia, Pa.
PRINDLE, FRANKLIN C.....Civil Engineer U. S. N., Navy Yard, Portsmouth, N. H.
PURDON, CHARLES D.....Resident Engineer Canal Bridge, Duluth, Minn.
RIFFLE, FRANKLIN .....Chief Engineer Oregon and Washington R. R., Portland, Ore.
WARDLAW, JAMES R.....305 West 138th st., New York City.
WASHBURN, FRANK S.....(Washburn, Shaler & Washburn), Purdy's Station, N. Y.
WAITMAN, THOMAS J.....2437 2d Carondelet ave., St. Louis, Mo.
WILDER, F. M.....(Care Indianapolis Car Co.), Indianapolis, Ind.

ASSOCIATES.

COMPTON, ALFRED G.....17 Lexington ave., New York City.
PHILLIPS, HENRY A.....30 Kilby st., Room 21, Boston, Mass.

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* Formerly spelled Pou.

JUNIORS.

ABBOTT, EDWARD L.....119 La Salle st., Chicago, Ill.
BISSELL, F. E.....Superintendent New Mexico Div. Union Pacific Ry., Denver, Col.
BLANC, FREDERIC N.....62 John st., New York City.
CLARKE, ST. JOHN.....(Care Passaic Rolling Mill Co.), Paterson, N. J.
CORNELL, J. N. H.....215 West 134th st., New York City.
FOLWELL, A. PRESCOTT.....(Care Am. Soc. C. E.), 127 East 23d st., New York City.
LYDON, WILLIAM A.....Assistant Engineer New Lake Tunnel, foot Park row, Chicago, Ill.
PURDY, C. T.....228 La Salle st., Room 41, Chicago, Ill.
RIDGWAY, ROBERT.....Assistant Engineer Aqueduct Commission, Purdy's Station, N. Y.
SANFORD, D. C.....P. O. Box 1507, New Haven, Conn.
SHERWOOD, GEORGE W.....Assistant Engineer Nicaragua Canal Construction Co., Greytown, Nicaragua.
SIKES, GEORGE R.....81 and 82 White Bldg., Buffalo, N. Y.
VIER, HENRY.....Assistant Engineer New York Central and Hudson River R. R., Rochester, N. Y.
WHITTEMORE, W. F.....439 Garden st., Hoboken, N. J.

FELLOWS.

CHENEY, NATHANIEL.....207 Broadway, New York City.
COLBY, CHARLES L.....President St. Paul and Northern Pacific R. R., 3 East 69th st., New York City.
DARWIN, HARRY G.....160 Broadway, Room 18, New York City.
HILL, JAMES J.....President Great Northern Ry., St. Paul, Minn.

DEATHS.

ACKENHEIL, CHARLES.....Elected Member February 2, 1887; died June 20, 1890.
LOWTHORP, FRANCIS C.....Elected Fellow March 17, 1870; died June 1, 1890.
WELD, F. FLOYD.....Elected Member September 3, 1884; died June 28, 1890.

July, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

JULY 2D, 1890.—At an adjourned session of the meeting of June 28th, held at New York, July 2d, 1890, ballots were canvassed and the following candidates declared elected. As Members: David Leonard Barnes, Chicago, Ill.; William Henry Jaques, Bethlehem, Pa.; Frederick Herbert Prentiss, New York City; Chalmers Scott, San Diego, Cal. As Associates: George Burnham, Jr., Philadelphia, Pa.; William Josiah Karner, Chicago, Ill. As Juniors: Job Rockfield Furman, New York City; Richard Calvin McCalla, Jr., Tuscaloosa, Ala.; John Cranch Moses, Detroit, Mich.; Algernon Sydney Nye, Jr., New York City; Camilo Enrique Pani, San Luis Potosi, Mex.; Sidney Austin Parsons, Duluth, Minn.

OF THE BOARD OF DIRECTION.

MAY 8TH, 1890.—Applications were considered. General business transacted.

JUNE 5TH, 1890.—Applications were considered. Details as to convention were arranged.

JUNE 30TH, 1890.—Applications were considered. Appropriations made.

THE ROWLAND PRIZE.

CODE OF RULES FOR ITS AWARD.

Not more than one prize shall be awarded each year for papers prepared during the year. The year shall terminate on the first day of August, and the award shall be announced at the annual meeting in January.

The prize shall consist of fifty dollars in cash.

The award shall be made by a committee consisting of the Secretary and two Members of the Society, to be appointed by the Board of Direction.

The prize shall be awarded to such paper as the committee deem most worthy of such recognition, the preference being given to papers describing in detail accomplished works of construction, their cost and manner of execution, and the errors in design and execution.

ABBREVIATIONS FOR DESIGNATING MEMBERSHIP.

The Board of Direction has declared the following as the authorized abbreviations to be used by Members of the Society having occasion to designate themselves as such:

For Honorary Members, -	Hon. M. Am. Soc. C. E.
For Member, - - - - -	M. Am. Soc. C. E.
For Associates, - - - -	Assoc. Am. Soc. C. E.
For Juniors, - - - - -	Jun. Am. Soc. C. E.
For Fellows, - - - - -	F. Am. Soc. C. E.

The Board of Direction requests the use of the above forms in all cases.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XVI.—September-October, 1890.

(No meetings of the Society were held during August, 1890.)

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

SEPTEMBER, 3D, 1890.—The Society met at 20 o'clock, President William P. Shinn in the Chair; Francis Collingwood, Secretary *pro tem.* Ballots were canvassed and the following candidates were declared elected. As Members: August William Boeke, Kansas City, Kan.; Charles Gleason Elliott, Gilman, Ill.; Charles Malon Mills, Phœnixville, Pa.; Joseph Allen Powers, Troy, N. Y.; Henry Hodge Quimby, Phœnixville, Pa.; Job Meade Tobias, Cartagena, U. S. Colombia. As Juniors: Francis Winthrop Scarborough, Richmond, Va.; John Joseph Tallon, Hoboken, N. J.; Wolfgang Gustav Felix Triest, Paterson, N. J.

A paper on "Notes on a Mountain Slide," by William G. Curtis, Director Am. Soc. C. E., was read and discussed by Messrs. Shinn, Collingwood, Brush, Crowell, Brendlinger and Haviland.

SEPTEMBER 17TH, 1890.—The Society met at 20 o'clock, Vice-President A. Fteley in the Chair; J. Foster Crowell, Secretary *pro tem.*

Mr. Charles B. Brush, Director Am. Soc. C. E., made announcements as to the meetings of the British Iron and Steel Institute to be held in New York, beginning Wednesday, October 1st.

A discussion by Max E. Schmidt, M. Am. Soc. C. E., of the paper on "Railways in Mexico," by W. Barclay Parsons, M. Am. Soc. C. E., was read, and the subject was discussed by Messrs. Pomeroy, Croes, Fteley, Brush, Flagg, Striedinger, Brendlinger, and Parsons.

A discussion by O. F. Nichols, M. Am. Soc. C. E., of the paper on "Tunnel Surveying on Division No. 6, New Croton Aqueduct," by F. W. Watkins, M. Am. Soc. C. E., was read and the subject was discussed by Messrs. Fteley, Croes, Washburn, Buck, Crowell and Watkins.

MEMOIRS OF DECEASED MEMBERS.

JOHN COLLINSON JAMES, M. Am. Soc. C. E.

DIED FEBRUARY 27TH, 1883.

Few men in the engineering profession attain prominence and a responsible position in charge of important works at such an early age as John Collinson James, superintendent of the engineering department of the Canadian Pacific Railway, who died February 27th, 1883, aged thirty-seven. When twenty years old he entered the service of the Grand Trunk Railway, where, by his eminent ability and faithfulness in the discharge of his duties, he gained the esteem and confidence of his superior officers and was soon placed in positions of trust where engineering skill was necessary, which had seldom been filled by any not having long experience.

At the time of his death he was considered one of the ablest engineers in the service of the company.

Mr. James was of good English birth, his father being Thomas James, Esq., of Otterbourne Towers, Northumberland, and his mother the daughter of the Rev. John Collinson, of Bolden Rectory, Newcastle. He was born at Otterbourne, in December, 1846. After completing the usual school education he entered Rossall College, Lancashire, for the special study of engineering.

He came to Canada in 1866, and immediately entered into the service of the Grand Trunk Railway, with Edmund C. Hannaford, M. Am. Soc. C. E., the Chief Engineer of the road. He remained for three years as draftsman and general assistant, and was then given charge of surveys along the line of the road. In 1870 he was appointed as First Assistant Engineer in the construction of the International Bridge across the Niagara River at Buffalo, and remained until 1872, when he was ap-

pointed Resident Engineer of the Grand Trunk Railway at Kingston, having the immediate charge and responsibility of the road between Montreal and Toronto, as well as of the Montreal and Champlain Railway.

In 1879 he took charge of the Chicago and Grand Trunk Railway as Chief Engineer, and completed the building of the road from Valparaiso to Blue Island. The condition of the road at the time of his appointment was poor, but his management was of such a character that before leaving it to accept the position of Chief Engineer and Superintendent of Construction of the Canadian Pacific Railway, which was tendered him in 1882, he had raised it to a high state of excellence.

As Chief Engineer of the western division of the Canadian Pacific between June and December 15th, 1882, he built and equipped 498 miles of road, placing them in first-class condition and the whole line in good working order. Considering the excellent condition of the road and the short time in which it was constructed, this may be regarded as a notable feat in the history of railroading.

Mr. James's death, at Winnepeg, at the height of his usefulness, was justly considered as a calamity, not only by the Canadian Pacific Railway, but by the whole engineering profession. It called forth hearty expressions of sympathy from the officers of the road and from many prominent citizens of Canada, as well as from the employees of the road.

His funeral services were attended by many of the principal officers of the Grand Trunk and Canadian Pacific Railways, by the employees of both companies, and by a large number of the prominent citizens of Montreal, where he was buried.

Mr. James's character as an engineer and as a private citizen was well outlined by the resolutions passed by the citizens of Battle Creek, Mich., where he resided, and the employees of the Chicago and Grand Trunk Railway, at a public meeting held shortly after his death.

"Possessing the qualities of character which fitted him for the special duties of his profession, clear intelligence, strong practical judgment, alertness in action, efficiency in results, uniform courtesy in official intercourse, and rare executive ability, he rose to a sphere of usefulness and prominence in railway service attained by few in our entire country.

"In his official relations with citizens and employees he was always the careful guardian of the important interests entrusted to his charge, while extending to all a friendly consideration, which made business intercourse with him a pleasure and personal satisfaction.

"Universally respected as an official, he was beloved by his subordinates, and in his relations with them he bore the character of friend rather than superior."

Mr. James was elected a member of the American Society of Civil Engineers March 1st, 1876.

OLIVER E. CUSHING, M. Am. Soc. C. E.

DIED JANUARY 17TH, 1890.

Oliver E. Cushing, a life-long resident of Lowell, Mass., and for over thirty years connected with the Lowell Gaslight Company, was born in that city in December, 1829, being the son of Stephen and Ethlinda Cushing.

His early education was such as the public schools at that time afforded, supplemented by a course of study at Phillips Academy, Andover, Mass. Possessing a natural inclination for engineering, after leaving school, he studied civil engineering and mechanical drafting and soon developed an aptitude for such pursuits.

In 1860 he was appointed agent of the Lowell Gaslight Company, and filled the position with such marked ability and general acceptance that he remained, uninterruptedly, in it until the day of his death, January 17th, 1890. A record of thirty years' continuance in the employment of one company gives clear evidence of the character and ability of Mr. Cushing.

For some years prior to his death he was President of the Board of Trustees of the Lowell Cemetery Corporation, taking an active interest in everything pertaining to its welfare; he was also a Vice-President of the Lowell Five Cent Savings Bank. Being a very unobtrusive man, and not in any sense a politician, he never sought public office, but was elected a member of the Board of Aldermen in 1885. This was the only public office he ever held.

In his personal character, both public and private, Mr. Cushing was beyond reproach. From his youth he was identified with St. Anne's Protestant Episcopal Church, and carried its truths into his daily life, every trust that was confided to him being discharged with conscientious fidelity. His modest goodness of heart, his thoroughly steadfast friendship and his personal probity were everywhere recognized as substantial elements in his attractive character.

Mr. Cushing was elected a member of the American Society of Civil Engineers July 10th, 1872, and took an active interest in its welfare.

MORRIS SHEPPARD BELKNAP, M. Am. Soc. C. E.*

DIED JULY 19TH, 1890.

Morris Sheppard Belknap, who died at Louisville, Ky., July 19th, of heart failure, was born in New Orleans, August 12th, 1845. He attended the public schools there until the commencement of the civil war, when he joined the Light Horse Cavalry under Captain Leeds, of the Confederate Army. In this command he was sent to Corinth and Shiloh. The company was assigned as escort to General Leonidas Polk, who commanded the Second Army Corps at that time.

Mr. Belknap was shortly thereafter detailed and sent to the trans-Mississippi department, under General E. Kirby Smith. He was here placed in charge of construction and maintenance of telegraph lines, where his aptitude for his later profession manifested itself.

In 1863, on examination, he was commissioned 1st Lieutenant of Artillery, Ordnance Department, C. S. A., and was assigned to duty under Colonel E. P. Alexander, at Government Arsenal, Marshall, Texas, where he partly constructed and had charge for some time of the powder works. He afterwards built and superintended the foundry and machine shops at the same place.

He remained in this position until the close of the war, and then returned to his home in New Orleans, and for a time was engaged as draughtsman for a foundry and machine shop. About the close of 1865 he accompanied his father's family to Paris, France, where, after a brief preliminary course of study, he was admitted into "L'Ecole Imperiale des Ponts et Chaussées." He graduated with honor in 1869. He was also a member of "L'Ecole des Beaux Arts," Department of Architecture.

Upon his return to the United States he was appointed assistant engineer on the Louisville and Nashville Railroad, under Albert Fink, Past President Am. Soc. C. E., Chief Engineer. At the same time he undertook the development of a stone quarry at Bowling Green, Ky., and later established an extensive stone business at Louisville, under the firm name of the Belknap Dumesnil Stone Company, assuming heavy contracts and erecting some of the largest State and Government buildings in the South and West.

He was contemporaneously employed by General St. John, then city engineer of Louisville, to assist in planning and building a system of sewers for Louisville. Whilst architecture and business had attractions for him, his natural inclination was for railroad work, and in 1880 he accepted the position of General Superintendent of the Mexican Central

* Committee to prepare memoir, Mr. W. R. Belknap.

Railroad, under Rudolph Fink, M. Am. Soc. C. E., who was then General Manager, with headquarters in the City of Mexico. He remained in this position a year, when the delicate health of his wife rendered his return necessary. As soon as he reached his home he was appointed Division Superintendent of the Louisville and Nashville Railroad, from Montgomery to Mobile, Pensacola and Selma.

After several years of active service he resigned, and assumed a similar position on the Vicksburg, Meridian and Shrevesport Railroad. This he changed for that of General Manager of the Georgia Central Railroad, which he continued to occupy until the latter part of 1889. He then accepted the office of Manager and Cashier of the International Mortgage Bank of the City of Mexico, which responsible position he held at the time of his death.

Through all his business life he bore himself bravely and cheerfully, endearing himself to those about him, whether social equals or employees.

In 1871 he married Miss Mary Ormsby Dumesnil, of Louisville, who, with his two daughters, survive him.

Mr. Belknap was elected a Member of the American Society of Civil Engineers, August 7th, 1872.

ERRATA.

Proceedings, Vol. XVI, p. 119, third line from bottom, for Mr. J. J. R. Croes, read Vice-President A. Fteley.

Vol. XVI.—October, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

OCTOBER 1ST, 1890.—The Society met at 20 o'clock, President William P. Shinn in the Chair; John Bogart, Secretary. Ballots were canvassed and the following candidates were declared elected. As Members: Guilliaem Aertsen, Latrobe, Pa.; William Sinclair Bacot, New York City; George Irving Bailey, Albany, N. Y.; Charles Backus Ball, Washington, D. C.; Percy Mortimer Blake, Hyde Park, Mass.; John B. Bott, Baltimore, Md.; Albert Newman Connett, Baltimore, Md.; Herbert Franklin Dunham, Cleveland, O.; Oscar Anton Frederik Saabye, Roanoke, Va.; Archibald Alexander Schenck, New York City; Hood Tucker, White Store, Tenn. As Associate: Patrick Henry Griffin, Buffalo, N. Y. As Juniors: Robert Augustus Cummings, Roanoke, Va.; Charles Robert Beltes, Hoboken, N. J.; William Chauncey Hawley, Chicago, Ill.; Ezra Booth Naylor, New York City; Homer Reed Stanford, St. Louis, Mo.; Richard Collier St. John, Princeton, N. J.

The Secretary announced the death on June 20th, 1890, of Charles Ackenheil, M. Am. Soc. C. E.; on September 18th, 1890, of Theodore Allen, M. Am. Soc. C. E.; on September 4th, 1890, of William H. Atwood, M. Am. Soc. C. E.; on July 19th, 1890, of Morris S. Belknap, M. Am. Soc. C. E.; on August 20th, 1890, of J. L. Gillespie, M. Am. Soc. C. E.; and on June 28th, 1890, of F. Floyd Weld, M. Am. Soc. C. E.

A paper by J. Fras. LeBaron, M. Am. Soc. C. E., on "The Fallacy of the Contract System of United States Land Surveys," was read by the Secretary and discussed by Mr. R. L. Harris.

OCTOBER 15TH, 1890.—The Society met at 20 o'clock, Vice-President A. Fteley in the Chair; John Bogart, Secretary.

A paper on "Steam Heating," by William E. Worthen, Past President Am. Soc. C. E., was presented by the author and discussed by Messrs. Francis, Emery, William J. Baldwin, Skinner, W. Howard White, H. W. Brinckerhoff, F. H. Baldwin, Fteley, A. G. Brinckerhoff, and Worthen.

OF THE BOARD OF DIRECTION.

SEPTEMBER 4TH, 1890.—Applications were considered. Appointment of committees considered. A proposed engineer's room in the Fannie

Paddock Hospital considered. Appointment of Board of Censors to award the Norman Medal and the committee to award the Rowland Prize considered.

SEPTEMBER 30TH, 1890.—Applications were considered. General business transacted.

MEMOIRS OF DECEASED MEMBERS.

RICHARD M. HOE, M. Am. Soc. C. E.

DIED JUNE 8TH, 1886.

A tinge of romance pervades the prosaic art of printing and clings to its inventors, from Coster of Haarlem, Gutenberg of Mentz, Dr. Faustus, who gained the reputation of being in league with the Devil because of his rapid production of books, down to Richard M. Hoe, the subject of this sketch, whose name is so prominently connected with modern inventions in the art of printing as to have become a household word in every civilized country, where to-day thousands of Hoe printing presses are printing books and newspapers in every known tongue.

Richard M. Hoe was born in this city, September 12th, 1812. His father, Robert Hoe, who was the founder of the firm of R. Hoe & Co., was a joiner by trade, who came to this country in 1803, just at the time of the yellow fever epidemic. He was stricken by the disease, but had made a friend of Grant Thorburn, the quaint old Scotch florist, and, through his auspices, was tenderly cared for. At the age of twenty the elder Hoe married a daughter of Matthew Smith, of Westchester. His brother-in-law, Peter Smith, was a Yale College graduate, and had invented the well known hand press which bears his name, which he was engaged in manufacturing. Matthew Smith, Jr., and Robert Hoe were called in to assist in the business, and eventually the death of the two Smith brothers left Robert Hoe in sole control of the business. He was a mechanician of much ability, and, seeing the crudity of the press he was making, he sent a trusted assistant over to England to examine the flat-bedded presses in use there. From his explanations Mr. Hoe began making improvements in his own press and soon the old Hoe press, a vast improvement on the presses then in use, was put upon the market.

Richard M. Hoe inherited his father's inventive skill and ability. He was early taken into his father's business, and when, in 1832, Robert Hoe, Sr., was obliged to retire on account of failing health, the business passed into the control of Richard, then a young man of twenty, and Matthew Smith, a son of the first partner of the senior Mr. Hoe. In the following year the first of the immense cluster of buildings which constitute the present Hoe establishment was built. Here Richard Hoe took up the manufacture of steel saws, and the many improvements in these, as well as in the line of printing presses, bear evidence to the wonderful inventive fertility of Mr. Hoe's mind. The list of separate patents taken out by Mr. Hoe fills a large volume. The history of modern improvements in printing is synonymous with the history of the development of the Hoe establishment. The business grew to enormous proportions, with the addition of department after department, in all of which Richard M. Hoe continued to be the brain and motive power.

It is related that in 932, when printing first came into general use, two ministers of the Chinese Emperor presented a memorial requesting that the Nine Classics, which had hitherto existed only in manuscript, should be printed; that this was done, and in about twenty years copies were in circulation; that within the next three centuries "most of the literature of former ages" had been printed. Compare this with the work of a Hoe press during, say twelve hours, when literature, equal in quantity at least to "most of the literature of former ages," is thrown off in a single day.

Mr. Hoe became a Member of the American Society of Civil Engineers November 21st, 1873. In his modest claim to membership he says: "I have been engaged as member of the firm of R. Hoe & Co. for the past forty years, and have had charge of the manufacturing department; have invented and patented some improvements in printing machinery!"

In his personal habits Mr. Hoe was simplicity itself. The possessor of a large fortune, won through his own ability, he would at any time don his working clothes and work out at the bench into the finished model any device which his brain had conceived. Always easily accessible to each of his men, he was greatly beloved by his employees. Mr. Hoe found a practical solution for the labor problem. He knew the importance of having educated workmen, and a man who has served his time in the Hoe shops is to-day acknowledged everywhere a master of his craft. To this end a school is established in the shop, in which the lads are taught thoroughly the English branches, regular schools hours being assigned from the time during which they are under pay; besides which there are evening schools in draughting and model making for all employees who care to attend. Any inventive ability in the men about him has always been encouraged by Mr. Hoe, and in the various re-organizations of the firm which have occurred many men whose ability

had won them positions as superintendents have been taken into partnership.

A few years before his death Mr. Hoe withdrew from active control of his business interests, leaving them, in some measure, to the younger members of the firm. Feeling the need of an entire rest, accompanied by his wife and daughter, he went abroad, intending to remain for some time, but he died suddenly in Florence, of heart disease, June 8th, 1886.

WILLIAM B. HYDE, M. Am. Soc. C. E.

DIED JUNE 8TH, 1882.

By the death of William B. Hyde, at the early age of forty, in the prime of a vigorous manhood, California lost one who had been identified with its interests for some years, and whose great energy and endless resources had made him prominent among the many of its noted citizens. A man of varied talents, with a mind intensely analytical, and with a mass of general information possessed by few, he was regarded by every one who came into contact with him as one of great ability and sound judgment. His engineering experience during the twenty years of his residence on the Pacific coast was varied. His first stated line of experience was from 1862 to 1864, in Gold Hill, Nevada, as partner in a construction firm engaged in the construction and repairs of mining and milling machinery. Here he was brought into active connection with and, at different periods, in entire control of the designing and actual construction of the largest kind of milling machinery as applied to the silver development of the State of Nevada. The dissolution of the company with which he was connected (The Pioneers' Foundry Company) becoming necessary through the results of a disastrous fire in 1865, Mr. Hyde accepted a position tendered him as chief of the Land Service of the Russian American Telegraph Expedition operating along the coast of the North Pacific Ocean under the charge of Charles L. Bulkly, as chief of the expedition. In this position he had control and superintendence of all matters relating to that branch of the expedition, embracing the organization of the department, the compilation of maps and all requisite statistical data to form the basis of subsequent action in the field, the organization and fitting out of surveying parties, and the actual command of the expedition in the work of making surveys.

In the summer of 1865 he made many surveys along the coast, taking

in the line of travel the post of Sitka, many of the Aleutian Islands, Behring Straits, ports on the Siberian coast and Petropaulovski in Kamchatka.

Upon the return of the expedition to San Francisco in 1866 he resigned his position and took employment as first assistant in the locating party of the Central Pacific Railroad Company, having the duty of locating the line of the road from the summit of the Sierra Nevada Mountains to the Big Bend of the Truckee River in Nevada.

After temporary work in 1868, with Lieutenant-Colonel Williamson, in preparing for photo-lithographic publication the plates in his book, "Use of the Barometer in Surveys and Reconnaisance," Mr. Hyde projected and secured the formation of a company for the construction of a railroad from Goat Island in the harbor of San Francisco, to Vallejo, a distance of 25 miles, connecting these points with the California Pacific Railroad. Of this company, the Terminal Railway Company, he was made chief engineer, and held that position until the summer of 1867, when the California Pacific Railroad took entire control, through purchase, of the line of the road.

In the fall of 1869 he entered the service of the Central Pacific Railroad of California, in the capacity of expert and general business agent attached to the personal staff of the President of the company, and continued in this relation until a few years before his death, which occurred June 18th, 1882.

He also held a similar position in connection with the Southern Pacific Railroad of California. During this period of service he was made the company's confidential agent and personal representative in negotiations with the Los Angeles and San Pedro and other railway companies, and in the construction of many miles of the line of the Southern Pacific Railroad extension, as well as of other contemplated extensions of the road through the Yosemite and San Joaquin Valleys.

He also developed, during this time, a plan for the supply of the City of San Francisco with water, and as a result the San Joaquin and San Francisco Water Works Company was incorporated in 1877. Of this company he was made a director and chief engineer. By this plan it was proposed to take the water of the San Joaquin River at a point 69 miles from San Francisco, where there was a tidal volume of great extent always available for use, and to carry it 12 miles by tidal conduit to a convenient point for pumping works, where by such works it could be pumped or pressed through an iron conduit 57 miles long directly into the center of the city and then distributed to requisite levels. In order to determine the feasibility of this plan of construction it became necessary to carry a line of borings across the bay of San Francisco to the depth of 25 feet below the bottom surface. He invented, constructed and put into successful use a new application of hydraulic sluicing power, and made a boring tool with which he made 2 500 feet of boring

holes 3 inches in diameter in 1 700 working (boring) minutes. About two miles of the line bored over was in water from 50 to 75 feet deep.

Mr. Hyde's plan was not adopted by the city, being considered too expensive and possibly not feasible.

After Mr. Hyde's withdrawal from the employ of the Central Pacific Railroad he became interested in the General Custer mine, and at the time of his death was the general manager and one of the heaviest stockholders.

He became a member of the American Society of Civil Engineers July 12th, 1877.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

	Date of Election.
BACOT, WILLIAM SINCLAIR.....Engineer County Roads, P. O. Box 596, Stapleton, Richmond Co., N. Y.....	Oct. 1, 1890
BALL, CHARLES BACKUS.....Engineer Dept., District Columbia, 942 T st., N.W., Washington, D. C.....	Oct. 1, 1890
BARNES DAVID LEONARD.....507 The Rookery, Chicago, Ill.....	July 2, 1890
BOEKE, AUGUST WILLIAM.....City Engineer, Box 373, Kansas City, Kan.....	Sept 3, 1890
BOTT, JOHN B.....Principal Assistant Engineer Maryland Central R. R., 2216 Oak st., Baltimore, Md.....	Oct. 1, 1890
CONNETT, ALBERT NEWMAN.....Principal Assistant Engineer Baltimore Traction Co., 1 Lexington st., Baltimore, Md.....	J. June 6, 1883 M. Oct. 1, 1890
DUNHAM, HERBERT FRANKLIN.....Consulting Engineer, Cleveland, Ohio.....	Oct. 1, 1890
ELLIOTT, CHARLES GLEASON.....Normal, Ill.....	Sept. 3, 1890
HENDERSON, JOHN BAILIE.....Engineer of Water Supply, Brisbane, Queensland, Australia.....	June 4, 1890
JARDINE, ALEXANDER WILLIAM....Engineer-in-Chief Harbors and Rivers, Brisbane, Queensland, Australia....	April 2, 1890
JAQUES, WILLIAM HENRY.....Bethlehem Iron Co., Bethlehem, Pa.....	July 2, 1890

KINDER, CLAUDE WILLIAM.....Engineer-in-Chief China Ry., Tientsin, China..... June 4, 1890
MARPLE, WILLIAM MCKELVEY.....304 Mifflin ave, Scranton, Pa. June 4, 1890
MILLS, CHARLES MALON.....Assistant Engineer Phœnix Bridge Co., Phœnixville, Pa..... J. June 2, 1886 M. Sept. 3, 1890
POWERS, JOSEPH A.....Lansingburgh, N. Y..... J. April 2, 1884 M. Sept. 3, 1890
PRENTISS, FREDERICK HENRY.....Chief Engineer and Manager New York Steam Co., 22 Cortlandt st., New York City July 2, 1890
QUIMBY, HENRY HODGE.....Phœnixville, Pa..... Sept. 3, 1890
RIFFLE, ALBERT STANLEY.....Care Ferro Carril del Callao al Ceredo de Pasco, Lima, Peru..... May 7, 1890
SCHENCK, ARCHIBALD ALEXANDER..Engineers' Office, New York Central and Hudson River R. R., Grand Central Station, New York City..... Oct. 1, 1890
SHIRREFFS, REUBEN.....150 Ellison st., Paterson, N. J. June 4, 1890

ASSOCIATES.

BURNHAM, GEORGE, JR.....Sec. and Treas. Bar Pumping Engine Co., 500 North Broad St., Philadelphia, Pa..... J. Jan. 6, 1875 A. July 2, 1890
GRIFFIN, PATRICK HENRY.....President New York Car Wheel Works, Buffalo, N.Y. Oct. 1, 1890
HOWE, MALVERD ABIJAH.....Professor Civil Engineering Rose Polytechnic Institute, 637 Cherry st., Terre Haute, Ind..... May 7, 1890
KARNER, WILLIAM JOSIAH.....205 La Salle st., Chicago, Ill. July 2, 1890

JUNIORS.

BRYAN, KENNERLEY.....38 Park Row, New York City. March 5, 1890
CUMMINGS, ROBERT AUGUSTUS.....Assistant Engineer Norfolk and Western R. R. Roanoke, Va..... Oct. 1, 1890
HAWLEY, WILLIAM CHAUNCEY.....P. O. Box 631, Galesburg, Ill. Oct. 1, 1890
MCCALLA, RICHARD CALVIN.....Tuscaloosa, Ala..... July 2, 1890
MOSES, JOHN CHANCE..... Bridge Department Michigan Central R. R., Detroit, Mich..... July 2, 1890
NAYLOR, EZRA BOOTH.....Grand Central Station, New York City..... Oct. 1, 1890

NYE, ALGERNON SYDNEY, JR.....250 West 38th st., New York City..... July 2, 1890
PANI CAMILO ENRIQUE.....Assistant Engineer Mexican Central R. R., San Luis Potosi, Mexico..... July 2, 1890
PARSONS, SYDNEY AUSTIN.....Assistant City Engineer, Duluth, Minn..... July 2, 1890
PERKINS, PHILO SACKETT.....Assistant Engineer New York, Providence and Boston R. R., Providence, R. I... Mar. 5, 1890
SCARBOROUGH, FRANCIS WINTHROP.Assistant Engineer M. W. Dept. Chesapeake and Ohio R. R., Richmond, Va.... Sept. 3, 1890
STANFORD, HOMER REED.....108 E. 3d st., Alton, Ill.... Oct. 1, 1890
TALLON, JOHN JOSEPH.....(Care Charles B. Brush), 1 Newark st., Hoboken, N. J..... Sept. 3, 1890
TYRRELL, HENRY GRATTAN.....Pencoyd, Pa..... Feb. 5, 1890
WHEATLEY, ARTHUR CORNWALLIS...Mexican Pacific Ry., San Cristobal Casas, Chiapas, Mexico..... May 7, 1890
YEATMAN, HENRY CLAY.....Mexican Pacific Ry., San Cristobal Casas, Chiapas, Mexico..... May 7, 1890

DEATHS.

ATWOOD, WILLIAM H.....Elected Member. May 4, 1881; died, September 4, 1890.
ALLEN, THEODORE.....Elected Member, November 16, 1870; died, September 1, 1890.
BELKNAP, MORRIS S.....Elected Member, August 7, 1872; died, July 19, 1890.
GILLESPIE, JOSHUA L.....Elected Junior, February 3, 1875; Member, April 2, 1884; died, August 20, 1890.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XVI.—November, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

NOVEMBER 5TH, 1890.—The Society met at 20 o'clock, President William P. Shinn in the chair; John Bogart, Secretary. Ballots were canvassed and the following candidates declared elected. As Members: Francis Renatus Fava, Jr., Washington, D. C.; Alexander Edward Kastl, Tampico, Mex.; John Nelson Ostrom, New York City; James Ritchie, Pittsburgh, Pa. As Associate: Henry Sylvestre Jacoby, Ithaca, N. Y. As Juniors: Henry Lewis Davis, New Haven, Conn.; Walter Lorton Dusenberry, New York City; George Hebard Paine, Swissvale, Pa.; Lee Treadwell, Sioux City, Ia.; Arthur Lee Shreve, Baltimore, Md.

J. J. R. CROES, M. Am. Soc. C. E.—Mr. President, the Constitution provides that the Nominating Committee shall report to the Board of Direction, "on or before the first day of November," and that the Board of Direction shall then cause the nominations to be posted in the rooms of the Society. It has been customary to announce those nominations at the first meeting in November. I wish to call the attention of the Chair to this fact.

The CHAIR.—The Board of Direction has not had a meeting since the Nominating Committee made its report, and, therefore, has had no opportunity to consider or act upon it. I will read for the information of the membership present, the subject matter of the report:

PITTSBURGH, October 25th, 1890.

To the Board of Direction of the American Society of Civil Engineers, New York City.

GENTLEMEN,—I am instructed by the Nominating Committee, appointed at the last annual meeting, to present to the Board of Direction, in accordance with Article 7, paragraph 4, of the Constitution, the following names as those selected by them as candidates for officers:

For President	OCTAVE CHANUTE.
For Vice-Presidents	JOHN BOGART, CHARLES HERMANY.
For Secretary	JOHN C. TRAUTWINE, Jr.
For Treasurer	G. S. GREENE, Jr.
For Directors	THEODORE COOPER, RUDOLPH HERING, CLEMENS HERSCHEL, ED. P. NORTH, S. WHINERY.

Very respectfully,
For the Nominating Committee,
CHARLES PAINE,
Chairman.

THEODORE COOPER, M. Am. Soc. C. E.—Mr. President, why has the usual courtesy of asking members whether they were willing to serve, been omitted? I certainly was not aware that my name was before the committee in any way. There are reasons which render me unwilling to act as a member of the Board, and I think it is very strange that my name has been handed in by the Committee without my consent.

The CHAIR.—Mr. Cooper asks a question which may be very pertinent to ask the Nominating Committee. As President I know nothing about it, and I am sure that the Board of Direction knows nothing about it. Mr. Cooper, of course, has a perfect right to decline to be a candidate for the office for which he has been nominated.

Mr. CROES.—The question which Mr. Cooper raises is a personal one, and it is not in the power of a meeting of the Society, as such, to take any cognizance of it; if Mr. Cooper declines to serve, he can make the announcement at the proper time. But I have listened with a good deal of surprise to the nominations that have been read here to-night, because in them there is more than a personal question involved—there is a question of the constitution and a question of law. One of the nominations which has been made is in contravention of the Constitution and Laws of the Society and in contravention of the Laws of the State of New York. The Law of the State of New York provides that any society incorporated,

as is the American Society of Civil Engineers, may annually elect from its Members, its Trustees, Directors, or Managers. The Constitution of the Society provides that the Trustees of the Society shall be the President, two Vice-Presidents, the Secretary, Treasurer, Librarian and five Directors. The Constitution further provides that the active members of the Society shall be divided into "three classes, to be styled respectively, Members, Associates and Juniors. Associates and Juniors shall possess all the rights and privileges of Members, except the right of voting." The Constitution provides further that of the names presented by the Nominating Committee for officers of the Society at least one Vice-President, three Directors, the Secretary and the Treasurer shall be Resident Members. The name that is presented by the Nominating Committee for Secretary of the Society is that of a person who is not, under any circumstances, eligible as an officer of the Society, for the reason that he is an Associate and not a Member, and is therefore not entitled to vote, whereas a Director and Trustee of the Society is compelled to exercise the highest possible right and privilege of voting in the management of the Society and its funds. Besides, he is not a Resident, as the Constitution requires. Consequently there is no nomination made by the Nominating Committee for Secretary of the Society, and I request that the President and the Board of Direction, in issuing the ballot and posting the names, shall omit from the list the name of John C. Trautwine, Jr., nominated for Secretary, as being no nomination at all.

The CHAIR.—Of course, it goes without saying that this question is not before this meeting for any action. I have stated the substance of the report of the committee for the information of the members, being entirely willing to hear any remarks that the members may wish to make upon the subject; but the meeting can take no action, the President can take no action. The matter of the report and what should be done under it and under the Constitution will come properly and finally before the Board of Direction at its meeting to-morrow night. It is probable that the Board of Direction will take cognizance of the suggestions that have been made. If any member desires to put his suggestion into stronger form and address a communication to the Board of Direction upon the subject it will receive due consideration.

The President introduced Dr. Charles G. Currier, who presented a paper on "Self Purification of Flowing Water and the Influence of Polluted Water in the Causation of Disease, a Biological Study." The paper was illustrated by the stereopticon, and by specimens of bacteria in process of culture. The subject was discussed by Messrs. Brush, Harris, Velschow, Worthen, Croes, Whinery, Fteley, Washburn and Dr. Currier.

NOVEMBER 19TH, 1890.—The Society met at 20 o'clock, Vice-President Alphonse Fteley in the chair; John Bogart, Secretary.

Written discussions of the paper on Self Purification of Flowing

Water and the Influence of Polluted Water in the Causation of Disease, a Biological Study, by Charles G. Currier, M.D., were presented by George W. Rafter, M. Am. Soc. C.E., William E. Worthen, Past President Am. Soc. C.E., and Prof. Albert R. Leeds, and the subject was discussed orally by Messrs. Hering, Fteley, Worthen, Leeds, Croes, and Dr. Currier.

MEMOIRS OF DECEASED MEMBERS.

HORATIO ALLEN, Past President and Honorary Member Am. Soc. C. E.

DIED DECEMBER 31ST, 1889.

The engineering profession, by the death of Horatio Allen, lost one of its oldest and most highly esteemed members; one who had been identified with many of the enterprises of the early part of the century, and who had seen and taken an active part in the inception and rise of railroading in the United States.

Mr. Allen was the son of Dr. Benjamin Allen, at one time Professor of Mathematics at Union College, Schenectady, and afterwards the principal of an academy established by him at Hyde Park, N. Y., and was born in Schenectady in 1802. Being the son of a teacher he had especially favorable opportunities for early training in study, and was able, through these and his diligent application, to graduate at Columbia College after a two years' course. He stood near the head of his class when he graduated in 1823, taking especially high rank in physics and mathematics.

His first inclination for a profession was to law, but after studying for a short time he found it uncongenial, and abandoned it for civil engineering, which he thought would be more in harmony with his taste and for which he was better fitted through his mathematical attainments.

Mr. Allen began his engineering course as rodman in a surveying party on the Chesapeake and Ohio Canal, then engaged at St. George's, Delaware, and after two weeks' service took entire charge of the party. In 1824, one year after his graduation, he was appointed resident engineer on the same work. The following year found him with the Delaware and Hudson Canal Company as resident engineer, under the late John B. Jervis, Hon. M. Am. Soc. C.E., the Chief Engineer of the Company. At that date, nearly all of the transportation of the country was by wagon or canal, very few railroads being in operation, and on these the carriage was by horse-power.

Mr. Allen's attention, as well as that of other engineers, was attracted to England, where, on the Stockton and Darlington Railroad, George Stephenson had put into successful operation traction by locomotives. Mr. Allen was greatly interested in the success of these locomotives and decided to go to England and study their working.

In a pamphlet published by him a few years ago, writing of this time, he says: "Such consideration as was within my power led me to a decided conviction as to the future of the locomotive as the tractive motive power for railroads for general freight and passenger transportation, as it had begun to be for mine transportation. Early in the year 1827, I had given all the attention that it was in my power to give, and having come to conclusions as to the locomotive, that all subsequent experience has confirmed, and believing that the future of the civil engineer lay in a great and most attractive degree in the direction of the coming railroad era, I decided to go to the only place where a locomotive was in daily operation and could be studied in all its practical details."

The Delaware and Hudson Canal Company intrusted to him, as contracting agent, the purchase in England of the railroad iron required for the construction of the portion of their road from the mines in Lackawanna Valley to the Lackawaxon, about 16 miles, as also the purchase of three locomotives on plans to be decided by him.

"This action of the Delaware and Hudson Canal Company was on the report of their Chief Engineer, John B. Jervis, and thus it occurred that the first order for a locomotive engine, after the locomotives on the Stockton and Darlington Road were at work, came from an American company, on the report of an American Civil Engineer."

Mr. Allen left New York in January, 1828, and on arriving in Liverpool made the acquaintance of George Stephenson, with whom he consulted in carrying out his plans. Every facility was offered by Mr. Stephenson, and through him Mr. Allen examined the working of the Stockton and Darlington Road, and was enabled to gain much information at Liverpool and at Newcastle, "at that time the center of all that was in progress in railroad and locomotive matters." He also visited the different roads then in operation and made a careful study of the locomotives in use. This investigation led him to the conclusion that those used by the Stockton and Darlington Road were the best, and he accordingly ordered of Messrs. Foster, Rastrick & Co., of Stourbridge, three locomotives of that type. One of these, the Stourbridge Lion, afterwards achieved distinction as being the first locomotive ever run in America.

In reference to the name, Mr. Allen said it was given "from the fancy of the painter who, finding in the boiler end a circular surface, slightly convex, of nearly 4 feet diameter, painted on it the head of a lion in bright colors, filling the entire area."

This "Stourbridge Lion," after being tested in New York, was sent

to Honesdale, Pa., where its first trip was made August 9th, 1829. Before being placed on the track it was discovered that "the axles had an unyielding parallel position, and that there was no truck with king bolt that would permit of the engine accommodating itself to the curve of the road." The green timber used in the construction of the road was of long lengths and had warped considerably in places. Notwithstanding these obstacles Mr. Allen was confident of success, but the engineer did not share in his enthusiasm and was unwilling to run the locomotive, nor was any officer of the road willing to risk his life in the attempt. Mr. Allen then determined to do it himself.

In his pamphlet he says: "When the steam was of right pressure, and all was ready, I took my position on the platform of the locomotive alone, and with my hand on the throttle-valve handle, said: 'If there is any danger in this ride, it is not necessary that the life and limbs of more than one should be subjected to danger.' I had never run a locomotive nor any other engine before. I have never run one since, but on August 9th, 1829, I ran that locomotive 3 miles and back to the place of starting, and being without experience and without a brakeman, I stopped the locomotive on its return at the place of starting."

To Mr. Allen must be given the honor of having run the first locomotive placed on a track in the United States; and when we consider the vast extent of railroading interests now and the large number of locomotive engines in use, it seems strange that one man should live to see such a wonderful growth.

In 1829, Mr. Allen was appointed Chief Engineer of the South Carolina Railroad, extending from Charleston, S. C., to Augusta, Ga., the first long railroad built in the United States. In 1834, when the road was finished, it was the longest in the world. After the completion of the road he married Miss Mary Moncrief Simons, of Charleston, daughter of the rector of St. Philips Church, and in company with her and her mother went abroad and spent nearly three years in foreign travel, visiting England and Scotland, then passing on to the Continent, down the Danube to Constantinople, thence to Egypt, and spending the winter on the Nile. In 1837, he went to Naples and Rome, and then through France to England, from whence he returned home.

Soon after his return he was appointed principal assistant engineer of the Croton Aqueduct under his former chief, John B. Jervis, who at that time was Chief Engineer of the work; and on the completion of the Aqueduct he was chosen one of the Board of Water Commissioners.

In 1842, Mr. Allen became a member of the firm owning the Novelty Works of New York, which soon felt his influence in the extension of business in various directions. The Novelty Works became celebrated for the construction of marine engines. Many of the ships of the Collins Line of steamers, as well as those of the Pacific Mail Steamship Company, were furnished with their machinery by the firm.

The reputation of the Novelty Works became so excellent that their engines were everywhere acknowledged as the best in use, and several contracts were made by the firm with foreign governments. Two large war ships for Italy were supplied with engines by the firm. The United States also contracted for the machinery of a number of vessels and monitors during the war of the rebellion. In 1863, the Secretary of the Navy appointed Mr. Allen to act in conjunction with Mr. Isherwood, Chief of the Bureau of Steam Engineering, in conducting a series of experiments to ascertain "the relative economy of using steam with different measures of expansion." A great many experiments on a large scale were made at the Novelty Works under this appointment, and conducted by Mr. Allen, which were expensive in their character but inconclusive in their results. The Navy Department, after an expenditure of $100 000, ordered them discontinued. The intrusting by the Government to Mr. Allen of a commission of such importance shows the estimation, as an engine-builder, in which he was held. Mr. Allen's mind was an inventive one, and during his business career, extending from 1841 to 1879, seventeen patents for inventions were granted him. The majority of these were for steam-engine stop-cocks, valve gears and cut-offs. The Allen & Wells cut-off was extensively introduced, and many steamboats still use it.

Mr. M. N. Forney, in an article published in the *Railroad and Engineering Journal*, gives the following list of patents issued to Mr. Allen:

Steam cut-off, H. Allen	1841
Stop-cock, H. Allen	1841
Steam cut-off, H. Allen	1842
Determining thickness of metal pipes, H. Allen	1843
Tapping mains, H. Allen	1843
Steam cut-off, "	1847
" " "	1849
" " "	1849
Steam-engine valve gear, Allen & Wells	1853
" " " " "	1853
Two-motion cone valve, H. Allen	1855
Steam-engine valve gear, "	1857
Steam boiler tube joint, "	1858
Car seats and couches, "	1866
Connecting the tubes with the heads of surface condensers, H. Allen	1868
Sleeping cars, "	1876
Terrestrial globes, H. Allen	1879

Mr. Allen was one of the proprietors of the Novelty Works until the dissolution of the company in 1870. During these years he was also connected with the Erie Railroad system, holding the office of President for one term and that of Chief Consulting Engineer for some time. He was also Consulting Engineer of the Panama Railroad Company. His last official position was that of Consulting Engineer of the East River Bridge.

In 1870 he retired from business and built a house at Montrose, on the Morris and Essex Railroad, where he passed the evening of his days in the quiet seclusion of his family, enjoying the pleasure of domestic life for which his quiet tastes well fitted him. He, however, took an active interest in everything pertaining to science and education, and his influence was widely felt through his participation in every effort to advance the interests or improve the condition of the poor of the city. His love for children led him to sympathize with them in their struggles for early knowledge, and to aid them he published simple books on arithmetic and algebra, believing that aids such as these were not to be found. After the love for his profession the study of astronomy came nearest to him, and he published a work on that subject and invented an orrery and other astronomical instruments for school use. Mr. Allen was a man of marked gentleness, and possessed of those traits of character which endeared him to all who knew him, and which left a pleasing impression upon those who met him only casually. His aid and sympathy were always extended to those in need whom he found deserving, and his earnest words of encouragement brought comfort and gave inspiration to many starting in the race of life. "It may be said of him that his integrity commanded the respect of all honest men who knew him; his generosity made many persons his debtors, and the delight which he took in contributing to the happiness of others led all to be 'kindly affectionate' to him."

Mr. Allen became a member of the American Society of Civil Engineers December 4th, 1867; was elected President of the Society November 1st, 1871, holding that office until November 5th, 1873, and was made an Honorary Member of the Society March 4th, 1874.

GABRIEL JORDAN, M. Am. Soc. C. E.

DIED NOVEMBER 10TH, 1884.

Gabriel Jordan was born February 1st, 1831, in Page County, Va. After leaving school he entered the Virginia Military Institute at Lexington and graduated July 4th, 1850.

Immediately after his graduation he was tendered a position on the Manasses Gap Railroad, but before accepting it he was appointed Assistant Engineer of the Memphis and Charleston Railroad. He served in this capacity until 1855, when he was made Chief Assistant of the eastern division. In 1857 he was appointed Chief Engineer of the Tennessee and Alabama Central Railroad (now forming a part of the Nashville and Decatur Railroad).

On the completion of the road, in 1859, he was made Chief Engineer of the Mobile and Great Northern Railroad (afterwards consolidated with the Alabama and Florida Railroad, under the name of the Mobile and Montgomery). He was connected with this road as Chief Engineer and General Superintendent until January 1st, 1877, a period of over fifteen years. During the progress of the work of construction, a difficult and interesting engineering problem was developed. From the highlands on the east side of Mobile Bay into the City of Mobile, a distance of 15 miles, the entire line of the road was laid upon a shifting, unstable marsh, subject to daily tidal overflow. There were embraced in this work nearly 12 000 feet of pile trestling, 3 600 feet of permanent bridging and seven draw-bridges. Of the permanent bridging 2 884 feet rested on cast-iron cylinders 6 feet in diameter, and sunk to position by powerful water jets. The remainder rested on screw pile piers, driven by the hand capstan invented by Mr. Sooy Smith, M. Am. Soc. C. E. This extensive work was completed in sixteen months.

Mr. Jordan resigned his position on the Mobile and Montgomery Railroad January 1st, 1877, and returned to the Memphis and Charleston Railroad as Chief Engineer and General Superintendent. At the same time he held the position of Chief Engineer of the East Tennessee, Virginia and Georgia Railroad.

In May, 1877, he was elected Vice-President, Chief Engineer and General Manager of the Houston and Texas Central Railroad, and filled that position to the time of his death, November 10th, 1884.

Mr. Jordan was also at one time President of the Central and Montgomery Railroad, and a director of the Louisiana Western Railroad and of the Houston Navigation Company.

His engineering experience extended over a period of over thirty years, during which time he was uninterruptedly engaged in the duties of his profession. He was held in high estimation, both as an engineer and a private citizen, and his death was felt as a great loss by the road with which he was connected, and by the community at large. He was elected a Member of the American Society of Civil Engineers September 18th, 1872.

THOMAS NORTON BAILEY, M. Am. Soc. C. E.

DIED APRIL 20TH, 1886.

Thomas Norton Bailey, Captain Corps of Engineers, U. S. A., who died at Willet's Point, N. Y., on the morning of April 20th, 1886, was born at Nashville, Tenn., January 16th, 1850. After his preparatory education he entered the United States Military Academy July 1st, 1869, and graduated from there June 13th, 1873, with the grade of Second Lieutenant in the Corps of Engineers. For some months following his graduation he served at the Military Academy in the Department of Engineering. He was then assigned to duty at Willet's Point, N. Y., at the Torpedo school, and with the Engineer batallion, where he remained until May, 1874, when he was transferred to Detroit, Mich., as Assistant Engineer on the Geodetic Survey of the Northern lakes. In 1876 he was appointed Acting Assistant Professor of Mathematics at the Military Academy, and filled that position and that of Professor of Mineralogy and Geology until August, 1880.

He served as Engineer Officer of the District of New Mexico from September, 1880, until March, 1881, and was then transferred to the Department of Missouri, where he remained until November, 1882.

In November, 1882, he was assigned to duty at Charleston, S. C., as assistant to Colonel Quincy A. Gillmore, Corps of Engineers, M. Am. Soc. C. E., and had local charge of river and harbor improvements, etc., at Charleston, S. C.; Savannah, Ga.; Brunswick, Ga.; Augusta, Ga.; Tybee Jetties; Forts Sumter, Moultrie, Jackson, Pulaski, etc.

He served with distinguised zeal and conscientious fidelity in the discharge of his duties in connection with these important works until February, 1885, when he was ordered to duty at the Engineer School of Application at Willet's Point, N. Y. At the time of his death he had command of one of the companies of the battalion of engineers stationed at that point.

Lieutenant Bailey was promoted to the grade of Captain in the Corps of Engineers, March 19th, 1884.

In all the different positions held by him he evinced a marked ability combined with an accurate judgment, which made him distinguished as an engineer officer. His death at such an early age was a loss to the army and to the profession at large. The estimation in which he was held by his commanding officer, Lieutenant-Colonel Cyrus B. Comstock, M. Am. Soc. C. E., can well be shown by an extract from the order issued announcing his death:

"To high intelligence, unflagging energy, and a rare sense of duty, there were joined in him the directness and frankness that win not only respect, but confidence and admiration. Few officers of his grade have

a brighter future than that which apparently laid before him; to few is it given to so attach others that the feeling of loss is as deep as it will be for him. He leaves a record to be copied by his associates."

Captain Bailey was elected a member of the American Society of Civil Engineers November 7th, 1883.

BENJAMIN H. GREENE, M. Am. Soc. C. E.

DIED JANUARY 4TH, 1890.

General B. H. Greene, who died January 4th, 1890, after a lingering illness, was born in Georgetown District, South Carolina, September 17th, 1830. After completing his preparatory studies he entered the State University at Columbia, and applied himself especially to the study of civil engineering. He graduated four years later, a short time after attaining his majority.

His first engineering experience was on the Nashville and Chattanooga Railroad, then in course of construction. On the completion of the road he was appointed Assistant Engineer of the New Orleans, Jackson and Great Northern Railroad, now forming a part of the southern system of the Illinois Central. In 1860 he was appointed Chief Engineer of the Gulf and Ship Island Railroad, running from Jackson, Tenn., to Gulfport, Miss.

During the war of the rebellion he served upon the staff of General Ewell, as Aid-de-Camp, and later as Chief Engineer of the Second Army Corps, commanded by General Thomas (Stonewall) Jackson.

At the close of the war in 1865, he was appointed Chief Engineer of the New Orleans and Jackson Railroad, which position he resigned a year later to accept that of Chief Engineer in charge of the Louisiana levees.

When Louisiana was placed under military control he was relieved of his position and he then resumed the duties of his old position as Chief Engineer of the New Orleans and Jackson Railroad.

His next engagement was that as Chief Engineer of the New Orleans, Baton Rouge and Vicksburg Railroad (now the Louisiana division of the Texas Pacific), which continued during the years 1870, 1871 and 1872.

In 1875, General Greene was appointed Chief Engineer of the New Orleans Pacific Railroad, designed to connect New Orleans with the Texas Pacific Railroad, with which road it was afterwards consolidated.

Upon the termination of this engagement he was employed by the Central Transit Company, to assume charge as Chief Engineer of a line of survey across the States of Louisiana and Texas, on the Erlanger system of railroads.

In 1885, General Greene was appointed by President Cleveland, Surveyor-General of Montana, for which position he was strongly indorsed by the entire Congressional delegation of Louisiana and by the presidents of the several railway companies that he had served. He also was strongly recommended to the President by the Secretary of the Interior, Colonel L. Q. C. Lamar, a college-mate and life-long friend.

He left New Orleans in December, 1885, for Helena, Montana, accompanied by his family. The press of New Orleans were unanimous in expressions of regret at his departure and of hope for success in his new field of operations.

During his residence in Helena, which continued until his death, General Greene, by his courteous bearing and genial disposition and by his sterling character made many friends. His loss was deeply felt by the citizens at large, for all who knew him honored him, and those who knew him best honored him the most. He was a fine type of an old southern gentleman, intelligent and refined and well calculated to make friends and hold them. He left a wife, two daughters and a son, to whom the heartfelt sympathy of the whole community was extended.

General Greene was elected a member of the American Society of Civil Engineers May 1st, 1878.

American Society of Civil Engineers.

PROCEEDINGS.

Vol. XVI.—December, 1890.

MINUTES OF MEETINGS.

(Abstract of such as may be of general interest to members.)

OF THE SOCIETY.

DECEMBER 3D, 1890.—The Society met at 20 o'clock, President William P. Shinn in the chair; John Bogart, Secretary. Ballots were canvassed, and the following candidates were declared elected. As Members: George Henry Kimball, Cleveland, Ohio; Horace Miller Marshal, Vicksburg, Miss.; James Orange, Hong Kong, China; William Abbot Pike, Minneapolis, Minn.; Henry Martyn Rood, Mechanicville, N. Y.; William Lucien Scaife, Pittsburgh, Pa.; George Colfax Smith, Montevideo, Uruguay; Richard Watkins, Sydney, Australia. As Juniors: William Hobbs Chadbourn, Jr., Chadbourn, N. C.; Chandler Davis, New York City; Charles Herbert Deans, New York City; Archer Cochran Stites, Kansas City, Mo.

The Secretary announced the death on November 25th, 1890, of Thomas J. Whitman, Past President Am. Soc. C. E.

The Board of Direction announced the nominations for officers, duly made, as follows:

NOMINATIONS MADE BY NOMINATING COMMITTEE.

For President	OCTAVE CHANUTE.
For Vice-Presidents	* JOHN BOGART, CHARLES HERMANY.
For Secretary	JNO. C. TRAUTWINE, Jr.
For Treasurer	* G. S. GREENE, Jr.
For Directors	* THEODORE COOPER, RUDOLPH HERING, CLEMENS HERSCHEL, EDWARD P. NORTH, S. WHINERY.

NOMINATIONS MADE BY MEMBERS NAMED BELOW.

For President	OCTAVE CHANUTE.
For Vice-Presidents	† CHARLES B. BRUSH, CHARLES HERMANY.
For Secretary	FRANCIS COLLINGWOOD.
For Treasurer	JOHN BOGART.
For Directors	† CHARLES H. MYERS, RUDOLPH HERING, CLEMENS HERSCHEL, EDWARD P. NORTH, S. WHINERY.

These nominations made by Messrs. John B. Duncklee, D. E. McComb, M. T. Endicott, Channing M. Bolton, S. T. Abert, H. Stanley Goodwin, John A. Wilson, Henry G. Morris, David Reeves, William F. Biddle, Charles G. Darrach, Joseph M. Wilson, Henry W. Wilson, A. B. Hill, C. L. Strobel, E. L. Corthell, J. F. Wallace.

NOMINATIONS MADE BY MEMBERS NAMED BELOW.

For President	OCTAVE CHANUTE.
For Vice-Presidents	‡ WALTER KATTÉ, CHARLES HERMANY.
For Secretary	JNO. C. TRAUTWINE, Jr.
For Treasurer	ALFRED P. BOLLER.
For Directors	JAMES E. CHILDS, RUDOLPH HERING, CLEMENS HERSCHEL, EDWARD P. NORTH, S. WHINERY.

These nominations made by Messrs. J. B. Johnson, M. L. Holman, Ben. L. Crosby, Robert Moore, Carl Gayler, George Burnet, E. D. Meier, Robert E. McMath, J. A. Ockerson, W. S. Lincoln, N. W. Eayrs.

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* Mr. John Bogart has declined the nomination for Vice-President. Mr. G. S. Greene, Jr., has declined the nomination for Treasurer. Mr. Theodore Cooper has declined the nomination for Director.

† Mr. Charles B. Brush has declined the nomination for Vice-President. Mr. Charles H. Myers has declined the nomination for Director.

‡ Mr. Walter Katté has declined the nomination for Vice-President.

NOMINATIONS MADE BY MEMBERS NAMED BELOW.

For President	OCTAVE CHANUTE.
For Vice-Presidents	ALPHONSE FTELEY, CHARLES HERMANY.
For Secretary	FRANCIS COLLINGWOOD.
For Treasurer	* W. HOWARD WHITE.
For Directors	RUDOLPH HERING, CLEMENS HERSCHEL, EDWARD P. NORTH, S. WHINERY, JAMES E. CHILDS.

These nominations made by Messrs. G. B. Nicholson, Latham Anderson, Robert L. Read, W. B. Ruggles, Ward Baldwin.

NOMINATIONS MADE BY MEMBERS NAMED BELOW.

For President	OCTAVE CHANUTE.
For Vice-Presidents	ALPHONSE FTELEY, CHARLES HERMANY.
For Secretary	JNO. C. TRAUTWINE, Jr.
For Treasurer	† FRANCIS COLLINGWOOD.
For Directors	CHARLES B. BRUSH, RUDOLPH HERING, CLEMENS HERSCHEL, EDWARD P. NORTH, S. WHINERY.

These nominations made by Messrs. John R. Freeman, Desmond FitzGerald, Frederic P. Stearns, John E. Cheney, W. E. Buck, W. E. McClintock, Henry Manley, H. H. Carter, William Jackson, L. Frdk. Rice, Charles H. Swan, Dexter Brackett.

NOMINATIONS MADE BY MEMBERS NAMED BELOW.

For President	OCTAVE CHANUTE.
For Vice-Presidents	ALPHONSE FTELEY, CHARLES HERMANY.
For Secretary	FRANCIS COLLINGWOOD.
For Treasurer	‡ CHARLES B. BRUSH.
For Directors	§ ALFRED P. BOLLER, RUDOLPH HERING, CLEMENS HERSCHEL, EDWARD P. NORTH, S. WHINERY.

* Mr. W. Howard White has declined the nomination for Treasurer.
† Mr. Francis Collingwood has declined the nomination for Treasurer.
‡ Mr. Charles B. Brush has declined the nomination for Treasurer.
§ Mr. Alfred P. Boller has declined the nomination for Director.

These nominations made by Messrs. M. J. Becker, A. Dempster, Thomas F. Johnson, J. H. Harlow, Thomas Rodd, W. Harrison Smith, James Ritchie, Alfred E. Hunt, George S. Davison, William Metcalf, George H. Brown, E. M. Bigelow.

NOMINATIONS MADE BY MEMBERS NAMED BELOW.

For President	OCTAVE CHANUTE.
For Vice-Presidents	*CHARLES B. BRUSH, CHARLES HERMANY.
For Secretary	*JOHN BOGART.
For Treasurer	*O. F. NICHOLS.
For Directors	*CHARLES H. MYERS, RUDOLPH HERING, CLEMENS HERSCHEL, EDWARD P. NORTH, S. WHINERY.

These nominations made by Messrs. E. Sweet, A. J. Swift, Horace Andrews, Arthur S. C. Wurtele, John P. Kelley, Joseph A. Powers, George I. Bailey, Charles F. Stowell, George P. Hilton.

NOMINATIONS MADE BY MEMBERS NAMED BELOW.

For President	OCTAVE CHANUTE.
For Vice-Presidents	ALPHONSE FTELEY, CHARLES HERMANY.
For Secretary	FRANCIS COLLINGWOOD.
For Treasurer	JOHN BOGART.
For Directors	CHARLES B. BRUSH, RUDOLPH HERING, CLEMENS HERSCHEL, EDWARD P. NORTH, S. WHINERY.

These nominations made by Messrs. H. W. Brinckerhoff, Alex. G. Brinckerhoff, John G. Van Horne, H. J. Gielow, George B. Cornell, F. H. Prentiss, Albert Lucius, William Rumble, Frank W. Skinner, John Thomson, Robert Cartwright, George B. Mallory, Emil Kuichling, P. F. Brendlinger, John T. Allen, Frank Nearing, W. N. Radenhurst, G. W. McNulty, C. C. Martin, G. Leverich, Samuel Probasco, G. F. Simpson.

On motion, it was *Resolved*, That the amendments to the Constitution, as proposed by the Committee on Revision,† be not read but published and sent out to members in advance of the annual meeting.

A paper on "Construction and Maintenance of Track," by Julien A. Hall, M. Am. Soc. C. E., was read by the Secretary and discussed by Messrs. George R. Hardy and Robert L. Harris.

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* Mr. Charles B. Brush has declined the nomination for Vice-President. Mr. John Bogart has declined the nomination for Secretary. Mr. O. F. Nichols has declined the nomination for Treasurer. Mr. Charles H. Myers has declined the nomination for Director.

† See following pages.

DECEMBER 17TH, 1890.—The Society met at 20 o'clock, Past President George S. Greene in the chair; John Bogart, Secretary.

The Secretary announced the death, on December 7th, 1890, of William B. Knight, M. Am. Soc. C. E.

A paper on "Street Railway Track," by T. G. Gribble, A. M. I. C. E., was read by the author and discussed by Messrs. North, Collingwood, Tratman, F. V. Greene, R. L. Harris, Hardy, Hutchinson and Gribble.

OF THE BOARD OF DIRECTION.

NOVEMBER 6TH, 1890.—Applications were considered. Nominations made by the Nominating Committee were presented and issue of notices directed. Report of the Committee on an International Engineering Congress was received.

DECEMBER 2D, 1890.—Applications were considered. Communications from various committees were received and action taken. Announcement of nomination for officers of the Society directed. General business transacted. Committee of Arrangements for Annual Meeting was appointed.

REPORT OF THE COMMITTEE ON REVISION OF CONSTITUTION AND BY-LAWS.

NEW YORK, November 5th, 1890.

To the Board of Direction of the American Society of Civil Engineers:

Your Committee on Revision of the Constitution and By-Laws submits herewith amendments to the Constitution, as follows:

First.—An amended Constitution of nine articles covering all points included in the present Constitution.

Second.—An article on Local Associations which, if adopted, will become Article IX of the Constitution.

These two amendments are to be submitted, discussed and voted upon separately.

Respectfully submitted,

WILLIAM P. SHINN.
MENDES COHEN.
CHARLES B. BRUSH.
F. COLLINGWOOD.
S. WHINERY.
C. L. STROBEL.*

*With the exceptions as explained in letter of Mr. Collingwood transmitted herewith.

Communication Accompanying the Report of the Committee on Revision of Constitution and By-Laws.

New York, December 1st, 1890.

To the Members of the American Society of Civil Engineers:

The Committee on the Revision of the Constitution and By-Laws, having been instructed by the resolutions appointing it, to submit its views upon any amendments which it might present for the action of the Society, complies with its instructions, as follows:

The Committee has made a systematic and careful revision of the Constitution, which was filed with the Secretary of the Society, as required by the provisions of the present Constitution. This has been presented in the form of an amended Constitution, consisting of nine articles; and also of a further amendment (being an additional article) specifically providing for the formation of Branches of the Society.

As has been heretofore reported, your Committee spent much time at the beginning of its labors in collating the laws governing all the prominent engineering societies, and in obtaining by correspondence and otherwise the views of the membership of our own Society upon the changes that were desirable in the present Constitution.

Your Committee also consulted freely with and gave full opportunity to the representatives of local engineering societies to present their views upon the subject of affiliation of such societies with this Society.

It soon became evident that the views held and changes suggested by those who responded to your Committee's inquiries were so radically diverse as to render it impracticable to entirely harmonize them, and after obtaining all the information that could be thus elicited your Committee recognized that its duty was to formulate such an amended Constitution as in the opinion of the members of the Committee was best adapted to promote the interests of the Society, and to submit the same for your approval.

While at the beginning there was great diversity of opinion among the members of the Committee upon many points, the result of their frequent discussions upon the facts, as brought out by their inquiries, has been the production of the amendments, as submitted.

The new features are noted and commented on, as follows:

ARTICLE II.—Membership.

This article provides for two new grades of membership. The class of Associate Members is created in order to make it practicable to raise the qualifications for the highest grades of membership, and to provide adequately for a professional class, not eligible to the full grade of Mem-

ber; and having especial reference to the immediate advancement to corporate membership of a large and deserving proportion of the present Junior grade.

The class of Subscribers is created to provide for such persons as may not be eligible to any other grade of membership, but who desire to have the privilege of attending meetings of the Society and of obtaining its publications, but more especially to provide for such members of local associations as may not be eligible to other grades of membership, in case connection with such local associations should become possible, through the adoption of the amendment herewith submitted, referring to such associations or branches.

The requirements for admission as Junior are lowered so as to bring such membership within the reach of all young men who, at the beginning of their career as engineers, desire to effect a connection with the Society, and to establish relations with their professional seniors.

ARTICLE III.—Admissions and Expulsions.

This article is amended in several essential particulars. Applicants are required to give references instead of endorsers, as it is believed that in this way disinterested and unbiased statements of the applicants' qualifications, character and standing can be obtained.

Applications for either grade of corporate membership are submitted to ballot as heretofore, but applications for other grades are, after sending to members notice of such applications, to be passed upon and finally determined by the Board of Direction, it being believed that the Society will be amply protected by the scrutiny of the Board against the admission of unworthy members to the grades which have no voice in the management of the Society's affairs. The labor and expense of letter ballots in such cases will thus be avoided.

With the increase in the number of voting members, it is thought best to raise to *seven* the number of voters required to exclude an applicant. On a vote for reconsideration in the case of an excluded applicant, it will require 10 per cent. of the votes cast to finally exclude. This is thought but reasonable, in view of the fact that the Board of Direction will have first made a reinvestigation and exhaustive inquiry into the qualifications of the applicant before resubmission to ballot, and will have become convinced of a probable error or misapprehension on the part of those previously voting in the negative.

ARTICLE V.—Officers.

Section 1 provides for an increase in the number of Vice-Presidents and for an enlargement of the Board of Direction, so as to make it more truly representative, and also for a lengthening of their respective terms of office, with ineligibility to immediate re-election, so as to pro-

duce rotation without the liability of seriously hampering the working operations of the Society by changing all the officers at any one election.

The provision making Past Presidents permanent members of the Board of Direction will, it is believed, secure to the Society the benefit of the knowledge and experience of such Past Presidents, and will be a fitting recognition of service rendered to the Society.

The provisions for filling vacancies in office and the exact definition of seniority between officers of the same grade are believed to be substantial and needed additions to the organic law.

Provision has been made for the selection of the President from those only who hold or have held the office of Vice-President or that of Director; and for the selection of the Vice-President from those only who hold or have held the office of Director. This, it is believed, will tend to secure for these offices members who have already acquired some experience in regard to the Society's affairs, and will lead to the selection of only the best men for the office of Director.

ARTICLE VI.—Management.

The changes in this article are important, and were arrived at only after very full discussion and consideration. Several provisions are inserted looking to the close inspection of the accounts of the Society and the adequate security of its funds. These will become of greater importance as the Society grows and its funds increase.

An Auditor is to be appointed by the Board of Direction to have charge of the books of account. An expert accountant is to make annually an examination of the accounts and funds and report upon the same; and a surety bond for the faithful performance of the duties of the Treasurer is to be secured.

It was upon the question of the duties, position and standing of the Secretary that the greatest diversity of views was found to exist. A large number of members have expressed the opinion that the Secretary of the Society, like the secretary of an ordinary business corporation, should be appointed by the Board of Direction, but those who so think forget or ignore the fact that, unlike the ordinary business corporation, the offices of President and Vice-President in this Society are of an honorary nature. The homes of these officers are most frequently in parts of the country remote from the Society's place of business, and it may often occur that they can perform but few of the executive duties. In fact the Society does not contemplate that the men whom it honors with such positions shall drop their professional duties to attend to society work, and it certainly does not propose to pay them for doing so. The executive duties must, however, be performed by some one, and at all times. The Committee has, therefore, distinctly named the Secre-

tary, under the President and Board of Direction, the executive officer of the Society.

If we stop for a moment to consider the important duties to be performed by such officer, often of a delicate and confidential character, it will be seen that he should have a voice in the deliberations of the Board; for he is the source of all information, and to him must be referred the detailed investigation of every question.

It is necessary, too, that the office should be filled by a person capable of representing the Society favorably, and deciding properly in the matters constantly arising in the intervals between the meetings of the Board; and this can only be well done by a professional man, of business experience and standing. Such a man cannot be easily secured for any sum which the Society can at present afford to pay; nor would such a man be willing to sever himself entirely from the field of professional engagement.

The Committee has provided for an Assistant Secretary to attend to the routine duties of the Secretary's office, who shall be appointed by and be subject to the Board of Direction, and who shall devote all his time to the duties of the office.

The provision for the appointment of special committees on engineering subjects has been changed so as to require positive support in the Society to any proposition for such appointment, and that a large vote of the corporate membership shall be necessary to the final adoption of any such proposition.

ARTICLE VII.—Nomination and Election of Officers.

The number of members of the Nominating Committee is increased to seven, and provisions are made for filling vacancies caused by ineligibility and declination.

A multiplicity of ballots is avoided by providing that all the nominees for each office shall be entered alphabetically on one ballot. Definite provision is made for the care of ballots, time of counting and declaration of the result.

ARTICLE VIII.—Meetings.

Provision is made for two general business meetings of the Society each year at the times when the largest number of members are present, at which times only can certain general questions be considered.

The quorum at all business meetings is raised to thirty.

Article IX (which, if the amendment in regard to Local Associations or Branches be adopted, will become Article X), amendments.

There is added to this article a provision whereby a proposed amendment, when presented at either of the two general meetings of the Society, may be referred to a committee for further consideration and

report at the next general meeting. It provides also for a definite time when amendments shall take effect.

ARTICLE IX.—Local Associations or Branches.

This article was the subject of much discussion, and was finally adopted as being in the opinion of the whole Committee, with one exception, as far as it is wise for the Society to move in that direction at the present time. It provides a basis upon which Branches of this Society may be organized, and which it is believed is broad enough to include all the membership of any of the existing clubs or societies that may choose to avail of it; for any members of such clubs or local societies who are not already members of this Society will be eligible for election to some one of the classes of membership provided for in Article II.

It also provides for printing and publishing the papers and discussions of such Branches.

It also provides for the exchange of papers and discussions with other societies when the Board of Direction may think such exchanges desirable.

The Committee submits the results of its protracted labors, with the hope that the amended Constitution may be adopted as a whole, and that the article on Local Associations or Branches may be equally fortunate in meeting the views of members.

The Committee believes that if adopted its working will be found a decided improvement over that of the present Constitution, and that from its arrangement any defects which may develop themselves may be speedily remedied by special amendment.

Respectfully submitted.

W. P. Shinn.
Mendes Cohen.
F. Collingwood.
S. Whinery.

The Committee regretted that Mr. Strobel could not take part in its final deliberations.

As Secretary of the Sub-Committee of the Committee on Revision, the undersigned was directed to correspond with Mr. Strobel and ask his signature to the final proof of the report. A letter received just previous to his departure for Europe, says: "You are authorized to sign my name to the amended Constitution, with the exception of those parts relating to the secretaryship and local associations." A letter received a few days before this states as follows: "The plan I prefer is the one I first proposed, of two secretaries—one elective, and one

appointed. I think the duties of the two will not clash. The next best plan is, in my opinion, to have the Secretary the appointee of the Board."

To get more fully at his view, so as not to misrepresent him, reference should be made to a lengthy communication to the Committee, dated November 1st, 1890, in which he says: "In my previous communication of date August 4th, I proposed that there be two secretaries, one to be called 'The Secretary,' who would be the officer of the Society at large, but appointed by the Board, and who would be required to give his entire time to the Society; the other to be called the 'General Secretary,' who would be the Secretary of the Board and a member of it, and who would be elected by the Society at large. The latter officer would be virtually the 'Honorary Secretary.' He should be a representative man, etc. As the majority of the Committee apparently do not approve of this plan, I would suggest the following modification of the Committee's plan: Retain the office of Secretary and Assistant Secretary as outlined in the draft. Make the Secretary the appointee of the Board. Do not require him to give his entire time to the Society."

The objections made by Mr. Strobel to the plan presented for local organizations lie chiefly in the expense each member must incur, and that it will be found to be unworkable. His plan proposes nothing more than a joint publication or an exchange of publications. He says, however: "I recognize the great difficulty of finding a satisfactory solution of this question; and perhaps the action taken was the best possible."

In accordance with permission given, I append the signature of Mr. Strobel, subject to the objections noted above.

F. COLLINGWOOD.

THE CONSTITUTION AS FINALLY REPORTED BY THE COMMITTEE ON REVISION.

CONSTITUTION.

ARTICLE I.—Name, Location and Object.

1.—The name of this Association shall be The American Society of Civil Engineers.

2.—The offices of the Society shall be located in the City of New York.

3.—Its objects shall be the advancement of engineering knowledge and practice and the maintenance of a high professional standard among its members.

4.—Among the means to be employed for this purpose shall be: meetings for the presentation and discussion of appropriate papers and for social and professional intercourse; the publication of such papers and discussions as may be deemed expedient; the maintenance of a library, the collection of maps, drawings and models, and the establishment of facilities for their use.

ARTICLE II.—Membership.

1.—The Corporate Members of this Society shall be designated as Members and Associate Members. There may also be connected with the Society, Honorary Members, Associates, Juniors, Fellows and Subscribers, who shall be entitled to all the privileges of the Society, except the right to vote and to hold office therein; provided that Honorary Members elected from the Corporate Members of the Society, shall retain their right to vote and to hold office.

2.—A Member shall be a Civil, Military, Naval, Mining, Mechanical, Electrical, or other professional Engineer, an Architect or a Marine Architect. He shall be at the time of admission to membership not less than thirty years of age, and shall have been in the active practice of his profession for ten years; he shall have had responsible charge of work for at least five years, and shall be qualified to design as well as to direct engineering works. Graduation from a school of engineering of recognized reputation shall be considered as equivalent to two years' active practice.

3.—An Associate Member shall be a professional Engineer or Architect not less than twenty-five years of age, who shall have been in the active practice of his profession for at least five years, and who shall have had responsible charge of work as principal or assistant for at least one year.

4.—Any person having the necessary qualifications prescribed in this article to entitle him to admission to the grades of Member or Associate Member, shall be eligible for such membership, though he may not be practicing his profession at the time of making his application.

5.—An Associate shall be a person, not a professional engineer, who, by scientific acquirements or practical experience, has attained a position in his special pursuit qualifying him to co-operate with engineers in the advancement of professional knowledge and practice, but who is not a professional engineer.

6.—A Junior shall be not less than eighteen years of age, and his connection with the Society shall cease when he becomes thirty years of age, unless he be previously transferred to another grade. He shall have had active practice in some branch of engineering for at least two years, or he shall have graduated from a school of engineering of recognized standing. He shall state in his application for membership that he intends to become or to continue to be an engineer.

7.—Honorary Members shall be chosen only from persons of acknowledged eminence in some branch of engineering or the sciences related thereto. There shall not be more than twenty at any one time.

8.—Fellows shall be contributors to the permanent funds of the Society, who may not be eligible for admission as Corporate Members.

9.—There may also be admitted to association with the Society as Subscribers, persons not less than twenty-one years of age who are not eligible for admission to any grade of membership otherwise provided for.

ARTICLE III.—Admissions and Expulsions.

1.—Honorary Members shall be proposed by at least ten Members, and shall be elected by a unanimous vote of the Board of Direction and such Past Presidents of the Society as shall be at the time Members and resident in North America. A Past President, or a member of the Board of Direction proposed for Honorary Membership, shall not be required to vote either for or against his own admission.

A person elected an Honorary Member shall be promptly notified thereof by letter. The election shall be canceled if an acceptance is not received within six months after the mailing of such notice.

2.—An application for admission to the Society as Member or as Associate Member, or for transfer from the lower to the higher grade, or for transfer from any other grade to either grade of Corporate Membership, shall embody a concise statement, with dates, of the candidate's professional training and experience; and shall be in a form and in such detail as may be prescribed by the Board of Direction. It shall be signed by the applicant, and shall contain a promise to conform to the requirements of membership, if elected. The applicant shall give at least five references,

who shall be Corporate Members in good standing, who shall each be requested by the Secretary to sign and forward a letter to the Board of Direction stating the extent of his knowledge of the applicant and of his qualifications, certifying that he knows the applicant personally and believes him to be in all respects a proper person to be admitted into the Society.

Applications of engineers not resident in North America, and who may be so situated as not to be personally known to five Corporate Members, may be recommended for ballot by members of the Board of Direction, after having secured evidence sufficient, in their opinion, to show that the applicant is worthy of admission.

3.—At stated periods, to be determined by the Board of Direction, there shall be issued to each member in any grade whose address is known, a list of all new applications received for membership in any grade or for transfer from one grade to another, which list shall be dated and shall contain a concise statement of the record of each applicant and the names of the references or indorsers, with a request that members transmit to the Board any information in their possession which may affect the disposition of the applications. Not less than twenty days after the issue of such list, the Board of Direction shall consider these applications, together with any information in regard to the applicants that may have been received; may make further inquiries, if deemed expedient; may classify the applicant with his consent, and on applications for Corporate Membership may direct a ballot.

4.—The ballots shall be letter-ballots, in a form to be prescribed by the Board of Direction. They shall be mailed to each Corporate Member whose address is known, and shall state the date on which the ballot is to be canvassed, which shall be not less than twenty days after the issue of the ballot. Seven or more negative votes shall exclude from election. In case of exclusion no notice thereof shall be entered on the minutes, but the candidate shall be notified.

5.—The Board of Direction, upon receipt of letters from not less than eight Corporate Members in good standing, requesting a reconsideration of the ballot on any excluded candidate and stating the reasons for such request, shall consider these reasons, and if the Board deems them sufficient, it shall cause a notice to be mailed to each Corporate Member whose address is known, giving the name and record of the applicant, and the names of those who ask a reconsideration. This notice shall include a request that any member having information which might aid in a proper consideration of the application, will at once transmit such information to the Board of Direction.

Not less than twenty days after the issue of this notice, the Board shall again consider the request with any additional information that may have been received, and it may continue the inquiry so as to secure the fullest information. If the Board decides that the reasons for a reconsideration are sufficient, it shall order another ballot to be taken. A letter-ballot in a form to be prescribed by the Board shall then be mailed to each Corporate Member whose address is known; and the vote thereon shall be canvassed at a meeting held not less than twenty days after its issue. Negative ballots to the number of 10 per cent. of the votes cast shall exclude.

The request for reconsideration of a ballot must be presented within one year after the date of the original canvass of such ballot.

6.—An application for admission as Associate, Junior, Fellow, or Subscriber, shall be in a form to be prescribed by the Board of Direction; shall embody a statement of the applicant's qualifications for the grade of membership to which admission is sought and a promise to conform to its requirements. The application shall be signed by the applicant, and it shall be indorsed by at least three Corporate Members, who shall certify that they personally know the applicant, that they believe him to be in all respects a proper person to be admitted to the Society, and that they recommend him for admission.

7.—The Board of Direction, after making such inquiries as it may deem expedient, shall have the power to elect persons so proposed, as Associates, Juniors, Fellows, or Subscribers; and shall notify the membership of its action.

8.—All elected candidates shall be duly notified and shall subscribe to the Constitution and Rules of the Society. Forms for these purposes shall be prescribed by the Board of Direction. If these provisions are not complied with within six months from the notification of election, such election shall be considered void, unless for special reason the time shall be extended by the Board of Direction.

Membership of any person shall date from the day of his election.

9.—Upon the written request of ten or more Corporate Members, that for cause therein set forth, a person belonging to the Society be expelled, the Board of Direction shall consider the matter, and if there appears to be sufficient reason, shall advise the accused of the charges against him. He may, if he so desires, present a written defense. Not less than two months after such notice has been given, the Board of Direction shall finally consider the case, and if resignation has not been tendered, or a defense made which is satisfactory to the Board, it shall then notify the person that he will be expelled in one month, unless he elects to appeal from this decision. Appeals will be submitted to the Corporate Members by letter-ballot in a form to be prescribed by the Board of Direction. The ballot shall be accompanied by a statement of the charges, and of the action of the Board thereon, with such information as it deems proper, and also the statement of the person making the appeal. The ballot shall be canvassed by the Board not less than twenty days after its issue. A majority of the ballots cast will be required to sustain the action of the Board. The Board will notify the person and the Corporate Members of the result of the ballot. In case no appeal be made, the Board of Direction will expel the person, and notify him and the Corporate Members of its action.

10.—A member of any grade in the Society may resign his membership by a written communication to the Secretary, who shall present the same to the Board of Direction ; when, if all his dues have been paid, his resignation shall be accepted.

11.—All persons elected and duly qualified, whose address on the records of the Society is within fifty miles of the Post Office in the City of New York shall be deemed Resident, and those whose address is beyond that limit shall be deemed Non-Resident.

The classification of each person for the fiscal year as Resident or Non-Resident, shall be determined by the Records of the Society as they may appear on January 1st of that year.

ARTICLE IV.—Dues.

1.—The entrance fees payable on admission to the Society shall be as follows: by Members, thirty dollars; Associate Members, twenty-five dollars; Associates, twenty dollars; Juniors, ten dollars; Subscribers, ten dollars.

2.—The annual dues payable by members, whether Resident or Non-Resident, shall be as follows: by Corporate Members, fifteen dollars; Associates, ten dollars; Juniors, ten dollars; and Subscribers, ten dollars.

3.—In addition to the dues prescribed in the preceding section, each resident member shall pay annually as follows: Corporate Members, ten dollars; Associates, Juniors and Subscribers, five dollars.

4.—A person transferred from any grade to a higher one shall pay the difference between the entrance fees of the two grades, and his annual dues shall be those of the higher grade.

5.—Persons elected after six months of any fiscal year shall have expired shall pay only one-half of the amount of dues for that fiscal year.

6.—All future annual dues may be compounded by a single payment by a Corporate Member of $250; or by an Associate or Subscriber of $150. Should a compounding Associate or Subscriber be elected to Corporate Membership he shall pay the further sum of $100.

Provided, That all compounding Corporate Members, Associates or Subscribers who may be or hereafter become Resident, shall be and remain liable for the annual payment of the difference between the annual dues of Resident and Non-Resident Corporate Members, Associates or Subscribers; but any Corporate Member may at any time compound for the future payment of all annual dues of every nature and kind by the payment of $75 in addition to the $250 hereinbefore named; and any Associate or Subscriber may at any time compound for the future payment of all annual dues as Associate or Subscriber by the payment of $40 in addition to the $150 hereinbefore named.

Provided, that any person desiring to compound for future dues shall have paid his entrance fee, all arrears of dues, and the annual dues for the current year, before the compounding sum may be available.

Persons compounding shall sign an agreement that they will be governed by the Constitution and Laws of the Society as they are now formed, or as they may be hereafter altered, amended or enlarged; and that in case of their ceasing to be connected with the Society from any cause whatever, the amount theretofore paid by them for compounding, and for entrance fees and annual dues, shall be the property of the Society.

All moneys thus paid in commutation of annual dues shall be invested as a permanent fund, only the interest thereupon being subject to appropriation for current expenses.

7.—Any person whose dues are more than three months in arrears shall be notified by the Secretary. Should his dues not be paid when they become six months in arrears he shall lose the right to vote or to receive the publica-

tions of the Society. Should his dues become nine months in arrears he shall again be notified in form prescribed by the Board of Direction, and if such dues become one year in arrears, he shall forfeit his connection with the Society. The Board of Direction, however, may, for cause deemed by it sufficient, extend the time for payment and for the application of these penalties.

8.—The Board of Direction may, for sufficient cause, temporarily excuse from payment of annual dues any member who from ill-health, advanced age, or other good reason assigned, is unable to pay such dues; and the Board may remit the whole or part of dues in arrears, or accept, in lieu thereof, desirable additions to the Library, or collections.

9.—Every person admitted to the Society shall be considered as belonging thereto and liable for the payment of all dues until he shall have resigned, been expelled, or have been relieved therefrom by the Board of Direction.

10.—Persons elected as Fellows shall become such upon the payment of Two Hundred and Fifty dollars into the permanent funds of the Society. They shall not be liable for other fees and dues.

ARTICLE V.—Officers.

1.—The Officers of the Society shall be: A President, four Vice-Presidents, eighteen Directors, a Secretary, and a Treasurer; who, with all living Past Presidents of the Society who continue to be Members, shall constitute the Board of Direction, in which the government of the Society shall be vested, and who shall be the Trustees as provided for by the laws under which the Society is organized.

2.—The terms of office of the President, Secretary and Treasurer shall be one year; of the Vice-Presidents, two years; and of the Directors, three years. Provided, however, that at the first election after the adoption of this Constitution, four Vice-Presidents and eighteen Directors shall be elected, of whom two Vice-Presidents and six Directors shall be elected to serve for one year only, and six Directors for two years only; provided, also, that after the first election two Vice-Presidents and six Directors shall be elected each year.

The term of each officer shall begin at the close of the Annual Meeting at which such officer is elected, and shall continue for the period above named or until a successor is duly elected.

3.—A vacancy in the office of President shall be filled by the Senior Vice-President.

A vacancy in the office of Vice-President shall be filled by the senior Director. Seniority between persons holding similar offices shall be determined by priority of election to the office; and when these dates are the same, by priority of admission to Corporate Membership; and when the latter dates are identical, the selection shall be made by lot. In case of the disability or neglect in the performance of his duty, of any officer of this Society, the Board of Direction shall have power to declare the office vacant. Vacancies in any office for the unexpired term shall be filled by the Board of Direction, except as provided above.

4.—Vice-Presidents, ex-Vice-Presidents, Directors and ex-Directors only shall be eligible for the office of President, and Directors and ex-Directors

only for the office of Vice-President. The President shall be ineligible for re-election. The Vice-Presidents and Directors shall not be eligible for re-election to the same office, until at least one full term shall have elapsed after the end of their respective terms.

5.—At least one Vice-President, the Secretary and the Treasurer, and six Directors shall be Resident Corporate Members during their term of office.

ARTICLE VI.—MANAGEMENT.

1.—The President shall have a general supervision of the affairs of the Society. He shall preside at meetings of the Society and of the Board of Direction at which he may be present, and shall be *ex-officio* member of all committees. He shall deliver an address at the annual convention.

The Vice-Presidents in order of seniority shall preside at meetings in the absence of the President, and discharge his duties in case of a vacancy in the office.

2.—The Board of Direction shall manage the affairs of the Society in conformity to the laws under which the Society is organized and the provisions of this Constitution. It shall direct the investment and care of the funds of the Society; make appropriations for specific purposes; act upon applications for membership as heretofore provided; take measures to advance the interests of the Society; appoint all its employées; and generally direct its business. The Board of Direction shall make an annual report at the Annual Meeting, transmitting the report of the Treasurer and of other officers, and of Committees.

3.—The Treasurer shall receive all moneys and deposit the same in the name of the Society. He shall invest all funds not needed for current disbursements, as shall be ordered by the Board of Direction. He shall pay all bills, when certified and audited, as provided by this Constitution and by rules to be prescribed by the Board of Direction. He shall make an annual report and such other reports as may be prescribed by the Board of Direction. The accounts and financial books of the Society shall be examined annually by an expert accountant to be selected by the Board of Direction.

The Board of Direction shall secure a satisfactory surety for the faithful performance of his duties by the Treasurer, and shall renew the same during the month of January of each year.

4.—The Secretary shall be, under the direction of the President and Board of Direction, the executive officer of the Society.

He will be expected to attend all meetings of the Society and of the Board of Direction; prepare the business therefor, and duly record the proceedings thereof.

He shall see that all moneys due the Society are carefully collected, and without loss transferred to the custody of the Treasurer.

He shall carefully scrutinize all expenditures, and use his best endeavor to secure economy in the administration of the Society.

He shall personally certify the accuracy of all bills or vouchers on which money is to be paid, and shall countersign the checks drawn by the Treasurer against the funds of the Society, when such drafts are known to him to be proper and duly authorized by the Board of Direction.

He shall conduct the correspondence of the Society and keep full records of the same.

He shall have charge of the Society's house and its contents; shall supervise the work of all employés of the Society, and see that they diligently perform their respective duties.

He shall perform all other duties which may from time to time be assigned to him by the Board of Direction.

5.—An Assistant Secretary, who shall also be Librarian, shall be appointed by the Board of Direction and shall aid the Secretary and be under his immediate direction in all matters. His whole time shall be given to the Society.

6.—An Auditor shall also be appointed by the Board of Direction, who shall have entire charge of the books of account of the Society, and shall furnish monthly to the Board of Direction a statement of receipts and expenses under their several headings, and also a statement of monthly balances.

He shall present annually to the Board of Direction a balance sheet of his books, as of the 31st December, and shall furnish from time to time such other statements as may be required of him.

7.—The Secretary and Treasurer shall be paid salaries to be determined by the Board of Direction; but such salaries shall not be reduced during the term of office, as provided in this Constitution. All other salaries shall be fixed, from time to time, by the Board of Direction.

8.—The Board of Direction shall meet within fifteen days after the Annual Meeting, and shall then appoint from its members a Finance Committee of five, a Library Committee of five, and a Committee on Publications of five. At least two members of each Committee shall be resident within fifty miles of New York.

These Committees shall report to the Board of Direction, and perform their duties under its supervision.

9.—The Finance Committee shall have immediate supervision of the accounts and financial affairs of the Society, shall audit all bills before payment, and shall make recommendations to the Board of Direction as to the investment of moneys and as to other financial matters.

10.—The Library Committee shall have general supervision of the Library and the House of the Society and the property therein; shall make recommendations to the Board with reference thereto, and shall direct the expenditure for books and other articles of permanent value, of such sums as may be appropriated for these purposes.

11.—The Committee on Publications shall have general supervision of the publications of the Society, and of contracts and expenditures connected therewith.

12.—In the consideration of papers offered for presentation, those papers containing matter readily found elsewhere, those specially advocating personal interests, those carelessly prepared or controverting established facts, and those purely speculative or foreign to the purposes of the Society, shall be rejected. The Committee on Publications shall determine which papers shall be read in full, and which shall be printed after reading by title only. The Committee may return a paper to the writer for correction and emendation,

and call to its aid one or more members of special experience relating to the subject treated, either to advise on the paper or to discuss it. Such papers as in the judgment of the Committee should appear in the Transactions, shall promptly, upon their acceptance, be printed and distributed to Members of all grades; others shall, with the consent of the authors, be suitably indexed and filed for reference, or the Committee may provide abstracts thereof, which, when approved by the authors, may be published instead of the original papers. Advance copies of papers and discussions may be sent out to the membership before final publication.

13.—Special committees to report upon engineering subjects shall be authorized only by a majority of the votes cast by the Society, and in the following manner: A proposition to appoint such a Committee shall be presented at a regular meeting of the Society and if sustained, on a motion to refer the same to the Board of Direction, by an affirmative vote of not less than twenty-five Corporate Members, it shall be so referred.

The Board of Direction shall then consider the same and report its recommendations to the Society at the next general business meeting, together with a statement of the arguments for and against the appointment of such Committee.

If a motion for the issue of a letter-ballot thereon receive the affirmative vote of two-thirds of the Corporate Members present, the Board of Direction shall, within thirty days thereafter, issue the letter ballot, accompanied by a statement of the arguments for and against the proposition.

A majority of a total vote of not less than one-third of the Corporate Membership of the Society shall be necessary for its adoption, whereupon the Committee so authorized shall be appointed by the Board of Direction.

ARTICLE VII.—Nomination and Election of Officers.

1.—At the business meeting of the Annual Convention a Nominating Committee of seven Corporate Members, not officers of the Society, shall be appointed by the Meeting. This Committee shall present to the Board of Direction, on or before the first day of October ensuing, a list of nominations for the offices to be filled at the next Annual Election. These nominations shall be so made, as to provide, with the officers holding over, a Resident Vice-President and six Resident Directors.

Directly after the first of October this list shall be mailed to all Corporate Members of the Society; provided that if any person shall be found by the Board of Direction to be ineligible for the office for which he is nominated, or should a nominee decline such nomination, his name shall not be sent out, but the Board of Direction shall substitute another name therefor.

At any time previous to the first day of December any ten or more Corporate Members may send to the Secretary additional nominations, signed by such Members.

Should the nominations made not include a sufficient number of Resident Members to comply with the requirements of this Section, the Board of Direction shall add names of Resident Members sufficient to comply therewith.

At least thirty days previous to the Annual Meeting there shall be mailed to every Corporate Member whose address is known, a letter-ballot with

envelopes for voting. This ballot shall include all the nominations made in accordance with this article. The names and residences of nominees shall be given ; all the names for any one office being arranged alphabetically, and without distinguishing marks of any kind, except that the names of Residents and Non-Residents shall be in separate groups and shall be so designated.

Members voting may erase names from the printed ballot list, and may substitute the name or names of any other person or persons eligible for any office. But the number of names for each office on the ballot voted must not exceed the number to be elected at that time to such office, and the vote must be for the proper number of resident and non-resident officers. Ballots not in accordance with these provisions must be rejected.

Directions in accordance with these provisions shall be issued with the ballots.

Ballots may be sent by mail to the Secretary, or may be presented to him at the Society House. They shall be enclosed in two sealed envelopes, the outer one of which shall be indorsed by the voter's signature.

2.—All ballots received by the Secretary shall be deposited in a closed ballot-box, and a ballot cast shall not be withdrawn.

The Secretary shall make from the indorsements on the outer envelopes a list of the voters from whom ballots are received, which list shall be open to inspection by all Corporate Members.

3.—The poll shall be closed at 12 o'clock noon on the first day of the Annual Meeting, and the ballots shall be canvassed publicly by tellers appointed by the presiding officer.

The persons voted for, for each office, Resident and Non-Resident, to the number of each class to be elected, who shall receive the highest number of votes, shall be declared elected.

In case of a tie between two or more candidates for the same office, the Annual Meeting shall elect the officer from among the candidates so tied.

The presiding officer shall announce to the meeting the names of the officers elected in accordance with this Section.

Article VIII.—Meetings.

1.—A Convention of the Society for the reading and discussion of professional papers and for social intercourse shall be held annually at such time and place as the Society may determine.

2.—There shall be two general Business Meetings of the Society each year : the Annual Meeting, which shall be held at the offices of the Society on the third Wednesday in January, and at which the annual reports for the year ending December 31st previous shall be presented, and the ballot for officers canvassed ; and a Business Meeting during the Annual Convention, which shall be held at a time and place to be determined by the Board of Direction.

At these Meetings thirty Corporate Members shall constitute a quorum.

3.—Business Meetings shall be held monthly on the first Wednesday of each month, except during the months of July and August. At these meetings thirty Corporate Members shall constitute a quorum.

4.—In addition to the Annual Meeting and the Annual Convention, meetings

for the reading and discussion of papers shall be held as ordered by the Board of Direction.

5.—Special Meetings may be called by the Board of Direction, and *shall* be so called on the request of thirty Corporate Members, which request shall state the purpose of such meeting. The call for such meetings shall be issued ten days in advance, and shall state the purpose thereof, and no other business shall be taken up at such meeting. At these meetings thirty Members shall constitute a quorum.

6.—The Society may adopt, from time to time, rules for the order of business at its meetings.

7.—Meetings of the Board of Direction shall be held at the time of the Annual Meeting and of the Annual Convention, at which meetings nine Members shall constitute a quorum; and at such other times as the Board may determine, at which five Members shall constitute a quorum.

ARTICLE IX.—Amendments.

1.—Proposed amendments to this Constitution must be reduced to writing and signed by not less than five Corporate Members, and be submitted and acted upon as follows:

2.—Amendments presented to the Secretary on or before the first Wednesday in November shall be sent by letter to the several Corporate Members of the Society at least twenty-five days previous to the Annual Meeting. Such amendments shall be in order for discussion at such Annual Meeting, and may be amended in any manner pertinent to the original amendments by a majority vote of the Annual Meeting, and if so amended shall be voted upon by letter-ballot in form as amended by the Annual Meeting; if not so amended, they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in March.

3.—Amendments presented to the Secretary on or before the first Wednesday in April shall be sent by letter to the several Corporate Members of the Society at least twenty-five days previous to the Annual Convention. Said amendments shall be in order for discussion at the Business Meeting during such Annual Convention, and may be amended in any manner pertinent to the original amendments by a majority vote of the Business Meeting during the Annual Convention, and if so amended, shall be voted upon by letter-ballot in form as amended by said Business Meeting; if not so amended, they shall be voted upon by letter-ballot as submitted. The vote to be counted at the first regular meeting in October.

4.—If, after discussion of a proposed amendment, at either of the general meetings of the Society, the meeting shall so decide by a majority vote, it may refer the amendment to a Committee for further consideration, which Committee shall report at the next general meeting, whereupon the amendment shall be voted upon as hereinbefore provided.

5.—An affirmative vote of two-thirds of all ballots cast shall be necessary to the adoption of any amendment.

Amendments so adopted shall take effect thirty days after their adoption, provided that the officers of the Society, at the time any amendment may be adopted, shall continue in office until the next annual election.

The following is separately proposed as an Article of the Constitution, and, if adopted, will become Article IX; the article referring to Amendments will then become Article X.

ARTICLE IX.—Local Associations.

1. Upon the application of Corporate Members desiring to organize branches of the American Society of Civil Engineers, the Board of Direction may authorize such branches at points where in its judgment the membership is sufficiently large to warrant a local organization.

2. Such branches, whose membership shall be limited to the various grades of members of the American Society of Civil Engineers, may adopt constitutions, elect officers, fix the local dues to be paid by their members, buy or lease property in their own names, appoint and hold meetings, establish libraries and reading-rooms, and do such other things as may be deemed necessary to promote their usefulness and as may not be inconsistent with the general policy of the Society, or repugnant to the Constitution, as may be determined by the Board of Direction. But such branches shall take no action and incur no liability in the name of the Society.

3. Each branch shall send to the Secretary of the Society every paper accepted by the Managing Board of said branch, and after the approval of the paper by the Committee on Publication, it may be published as provided in Section 12 of Article VI.

A copy of every paper read before the Society shall also be sent, when printed, to each branch, for its library.

The discussions held at the several branches shall be forwarded to the Secretary, edited by him, and the substance thereof may be published in the usual manner.

4. The Board of Direction is authorized to formulate from time to time the necessary rules for carrying into effect the provisions of this Article.

5. The Board of Direction may, whenever it deems it proper, enter into relations with other scientific or professional societies with a view of exchanging papers and discussions.

6. After the establishment of such relations, the Board of Direction may authorize the issue of the Transactions and separate papers to these societies in such quantities as they may desire at favorable rates, or in exchange for the publications of said societies.

MEMOIRS OF DECEASED MEMBERS.

ALEXANDER LYMAN HOLLEY, Past Vice-President Am. Soc. C. E.

DIED JANUARY 29TH, 1882.

Alexander Lyman Holley was born at Lakeville, in Salisbury, Conn., July 20th, 1832, being the son of Alexander H. Holley, afterward Governor of that State, and Jane M. Lyman, his wife, a descendant of one of the old families of New England.

The education of his early boyhood was gained from the district school near his home, supplemented by a few terms at the Academy at Salisbury. From Salisbury he went to the Academy at Farmington, Conn., and then to Williams Academy at Stockbridge, Mass., preparatory to his entrance to Yale College, where his father desired to place him.

Throughout these early years of study one chief object seemed ever before him, the gaining of knowledge of all kinds of machinery and especially of engines. The natural bent of his mind led him to take a close interest in the principles of the construction of machinery, and to attain this knowledge all his youthful energy was directed. In 1850, at the age of eighteen, he wrote a treatise on cutlery, describing with accuracy and in a clear and forcible manner the machinery employed in its manufacture and the process through which the steel passes. This was published in *Poor's Railway Journal*, and was the first article from his pen for which he received compensation.

The bent of his genius became so evident to his father that he relinquished the idea of placing him at Yale College and instead sent him to Brown University, which had just established a scientific course. He graduated in 1853, taking as a subject for his graduation essay, "The National Motor," in which he showed his intense enthusiasm for his chosen line of study—locomotive machinery.

While a student at Brown University he invented a steam cut-off, for which he could have had a patent but for the fact that the fundamental improvement on which it was based had been patented in England a few years before. His invention, however, was entirely his own, as he had never seen or heard of the English patent.

Immediately after his graduation Mr. Holley entered the locomotive department of the shops of Corliss & Nightingale, at Providence, and remained there eighteen months. With his mind continually on locomotive engines he found the work of the Corliss Company too restrictive, as they confined their business to the building of stationary engines, and left their employment to seek work where locomotive engines were built. After many discouragements and vain efforts to obtain work where he might be able to carry out his ideas of the proper manner of building locomotives, he found employment at the New Jersey Locomotive Works, where Zerah Colburn had been superintendent. He remained here in active, congenial work until 1855, when he became a partner with Mr. Colburn of the *Railroad Advocate*, established by the latter a year before. Mr. Holley had been an occasional contributor to the *Advocate* for some time, and had written several articles on the Corliss engines which attracted much attention. In 1856 he became sole proprietor of the paper, and until July, 1857, conducted its publication alone, when Mr. Colburn again joined him, and the *American Engineer* succeeded *Holley's Railroad Advocate*. After a few months the publication was suspended, not to be resumed.

Mr. Holley and Mr. Colburn went to Europe in the autumn of 1857 to study the foreign railway practice, which resulted in the issue of a report, printed in a folio volume, entitled "The Permanent Way and Coal-Burning Locomotive Boilers of European Railways." This, although not successful as a business enterprise, became an authority in railway building, and, through its comparison of the cost of English and American railroads, did much to attract the attention of capitalists to the cheapening of American railroad building.

In 1859 Mr. Holley became a special contributor to the New York *Times*, then under the editorial management of Henry J. Raymond, and wrote many articles on engineering topics which attracted so much general notice that the *Times* became an authority on the subject.

Mr. Holley published his "Railway Practice," still regarded as a standard work, in 1860. The materials for this were gathered in Europe, where he had gone with Mr. Raymond, during the previous two years.

During the same period he prepared for a new edition of Webster's Dictionary a list of engineering words and definitions, and made several hundred drawings for illustration of engineering topics.

He again went to England in 1862 to investigate ordnance and armories, having been led to this through his connection, in a literary capacity, with Mr. R. L. Stevens, the inventor of the Stevens Battery. This visit resulted in the publication, in 1864, of "Ordnance and Armor," a volume of 900 pages, which took high rank as a recognized authority. It was translated into French a short time after its appearance.

While in England, between 1862 and 1864, Mr. Holley became interested in the Bessemer process of manufacturing steel. He suc-

ceeded in purchasing the patent right for America, and built the steel works at Troy, the Bessemer Steel Works and rolling mills at Harrisburg, Chicago and Joliet, and the Edgar Thomson works at Pittsburgh. He made many improvements on the English Bessemer process, whose importance it is impossible to exaggerate, for they entirely changed the commercial relations of the manufacture of steel, by greatly decreasing the cost whilst at the same time increasing the capacity for production.

Mr. Holley took a prominent part in all discussions pertaining to steel, and contributed frequently to English and American journals, on this and kindred subjects, and to him, probably, more than to any other is due the development of the steel industry in the United States. He also achieved a certain amount of success as an inventor. Sixteen patents were granted to him, two of which, taken out in 1859, were for a variable cut-off valve for steam-engines, and another for railway chairs. Ten of his patents refer to improvements in the Bessemer process.

Mr. Holley was a member of many scientific societies, and of many important committees. In 1865 he became a member of the Board of Trustees of the Rensselaer Polytechnic Institute. In 1875 he was appointed a member of the United States Board for testing iron and steel; and in 1876 was one of the jurors on iron and steel appointed by the Commissioners of the Centennial Exposition, and made the report on that subject. He was one of the founders of the American Institute of Mining Engineers, and much of its success is due to his energy and influence. He was elected a member of the American Society of Civil Engineers October 1st, 1873, and in 1875 was made Vice-President.

In conjunction with Professor Robert H. Thurston and other prominent engineers, in 1879 he founded the American Institute of Mechanical Engineers, of which he was first President. He was also a member of the Iron and Steel Institute and of the Institution of Civil Engineers.

Mr. Holley read many papers on engineering subjects before these various societies, all marked by the close observation and keen insight into principles which were so characteristic of him.

The Iron and Steel Institute, in which Mr. Holley took an active interest, in recognition of his eminent services to science, forwarded to his family the Bessemer medal for 1882, an exceptional honor to an American engineer.

The closing years of Mr. Holley's life were still marked by the energy and force of his character. Although at times almost prostrated from overwork, his strong will and buoyant, cheerful disposition bore him through. In August, 1881, whilst in Europe, he was seized with illness, but was able to attend a banquet in London, given by the Lord Mayor to the members of the Iron and Steel Institute, and made a speech in reply to a toast to the United States. He was ill for some time after

this, and in December returned to his home in Brooklyn, where he died January 29th, 1882.

Mr. Holley was so well known to the members of the American Society of Civil Engineers that no eulogy of him is necessary. His life spoke for him, and his death, from the many tributes of sorrow which it called forth, showed the high regard in which he was held by the leading men of science in England and America. A life such as his, marked by the qualities which go to make up a true manhood and characterized by an unflagging energy and perseverance, is one worthy of imitation.

HENRY H. GORRINGE, Assoc. M. Am. Soc. C. E.

DIED JULY 6TH, 1885.

Henry H. Gorringe, late Lieutenant-Commander in the United States Navy, who died in New York, July 6th, 1885, of spinal disease, the result of an accident, was born in Barbadoes in 1840. His father was a clergyman of the Church of England, who after taking his degree at Oxford went to the West Indies and married the daughter of a fellow-clergyman.

He had the best education the island afforded, but at a very early age he became enamored of a sea life and requested his father's permission to go to sea. Upon his father's refusal to grant permission he quietly informed him that he intended to run away. His father persuaded him to wait one year, promising that if he was then in the same mind permission would be given him. At the expiration of the year he shipped as cabin boy on board a vessel bound for England, and from that time until 1882 he was almost continuously at sea. At the age of nineteen he had the position of chief mate in a New York ship, and before he attained his majority was made captain.

In 1862 he entered the United States Navy as master's mate, and was detailed to duty with the Mississippi squadron. He served through the war with this squadron, under Admiral Farragut, and was three times promoted for gallantry in battle. At the close of the war he commanded the steamer *Memphis* for two years, and was then made a regular officer of the navy, with the rank of Lieutenant-Commander.

From 1869 to 1871 he commanded the *Portsmouth* in the South Atlantic squadron, and was then given shore duty in charge of the Hydrographic Office, Washington. After four years' service in this position he was given command of the *Gettysburg*, for special service in a two-years' cruise in the Mediterranean. On his return he was granted leave of absence to convey to New York the obelisk, which had

been presented by Egypt to the United States. During his sea service he commanded ten merchant vessels and sixteen different vessels of the United States Navy.

Mr. Gorringe will always be best known from his connection with this obelisk, for it was from its removal from Egypt to New York that his fame as an engineer was chiefly derived.

When Mr. W. H. Vanderbilt determined to secure for New York the gift of the Khedive, by paying the expenses of its transportation, he applied to the Navy Department for the detail of an officer competent to execute the task. Lieutenant-Commander Gorringe was at once selected and granted a furlough. He went to Egypt in 1880, and after many discouragements which would have baffled the energies of a less confident man, he succeeded in lowering the obelisk from its position and placing it in the vessel purchased by him for its conveyance to its destination.

Fifteen months after the work of removal began in Alexandria, it was successfully erected in Central Park, New York, January 22d, 1881.

The means employed to accomplish his purpose were most ingenious and deserved and received prompt acknowledgment from the engineering world. In 1882 he published a work, "Egyptian Obelisks," giving a history of all the obelisks which have been taken from Egypt, and a description of the removal of the one erected in Central Park.

Commander Gorringe was the recipient of many honors for this feat and delivered several lectures before the New York Geographical Society and other scientific bodies in different parts of the country. He also, through his success, became prominent as a consulting engineer, and was engaged in many important engineering projects.

In 1882 he resigned his position as Lieutenant-Commander and engaged in private business. He was the organizer and manager of the American Shipbuilding Company, and after it became necessary to close its operations was appointed receiver. He was engaged in settling its affairs when the accident occurred which eventually caused his death.

Mr. Gorringe was elected an Associate of the American Society of Civil Engineers, April 6th, 1881.

HENRY SMITH CRAVEN, M. Am. Soc. C. E.

DIED DECEMBER 7TH, 1889.

Henry Smith Craven, Lieutenant-Commander U. S. Navy, son of Rear-Admiral Thomas T. Craven, was born at Boundbrook, N. J.,

October 14th, 1845. After a course of study at Hobart College he took employment in the Croton Aqueduct under J. J. R. Croes, M. Am. Soc. C. E. Two years later, in 1866, he went to California, and was engaged as topographer with Professor Whitney, then in charge of the State Geological Survey.

In 1868 he was appointed Assistant Civil Engineer of the Navy Yard at Mare Island, California, and remained on duty at that place until 1872, when he resigned the position to engage in private engineering business in San Francisco.

From this date until 1879 he had charge at different times of many important mining and civil engineering works. For some time he was Engineer of the Cerro Gordo Union Mine and Superintendent of the Great Eastern Quicksilver Mine. These positions he resigned to accept that of Chief Engineer of the Mokulumne Ditch and Irrigation Company. He was also during this period Engineer in charge of the Reclamation of Overflow Lands in California.

In 1879 he was appointed a Civil Engineer in the U. S. Navy, with the rank of Lieutenant-Commander.

After several years' service he was granted leave of absence, and was appointed Engineer of Construction of the Croton Aqueduct Commission.

Upon the expiration of his leave of absence he returned to duty, and was assigned to Boston Navy Yard, and later to the Brooklyn Navy Yard.

He was attached to the latter station at the time of his death, December 7th, 1889.

Mr. Craven was elected a Member of the American Society of Civil Engineers December 8th, 1884.

WILLARD HUMPHREY WIGHTMAN, M. Am. Soc. C. E.*

DIED OCTOBER 29TH, 1890.

Willard Humphrey Wightman was born at Hastings, Oswego County, N. Y., January 31st, 1852. He was educated in the public schools and Mexico Academy, after which he was engaged for a short time at engineering work.

In 1877 he entered Cornell University and took the full course of civil engineering, graduating in 1881. Soon after graduating he entered

* Committee to prepare Memoir, Mr. H. S. Huson, M. Am. Soc. C. E.

the service of the Union Pacific Railroad, where he served in various capacities in the engineering department on that road for a period of three years.

In 1884 he accepted a position on the Northern Pacific Railroad as office draftsman. In the spring of 1885 he was appointed on the same road as Resident Engineer on the construction of its Cascade Division, having charge of the grading and revision of surveys for one of its residencies. Shortly afterward he was assigned to duty as Assistant Engineer in charge of track-laying and bridging.

During the winter of 1886 and 1887 he left railroading, and was engaged in making Government surveys in Idaho and Oregon as Deputy United States Surveyor. In the spring of 1887 he again accepted a position on the Northern Pacific Railroad as Assistant Engineer and Superintendent in charge of the construction of the Kennewick Bridge across the Columbia River, near Pasco, in the then Territory of Washington, where he remained for one year.

In 1888 he was appointed Assistant Engineer in charge of the construction of the Spokane and Palouse Railway, which is a branch of the Northern Pacific extending from Marshall, Washington, to Genesee, Idaho, a distance of 106 miles. He continued to act in that capacity until a few weeks before the time of his death, when he resigned on account of ill health.

He died at his home in Ashland, Oregon, October 29th, 1890. His death was caused from taking a severe cold, just as he was getting over the measles, which resulted in lung trouble, thus carrying him off in a few months.

In all the various engineering positions which Mr. Wightman occupied he was trusted both by employer and employed. He was an engineer of no mean merit and promise, and left behind him some very creditable work. In his death the American Society of Civil Engineers lost a competent and faithful member of the profession.

ANDREW ATKINSON HUMPHREYS, Hon. M. Am. Soc. C. E.

DIED DECEMBER 27TH, 1883.

By the death of Brigadier-General Humphreys, which occurred in Washington, D. C., December 27th, 1883, the army lost one of its most

efficient engineers and one of its oldest officers, one who had been in its service for nearly half a century, and who had for many years held the highest position in the Engineering Bureau.

Andrew Atkinson Humphreys' whole life may be said to have been associated with the naval or military service of the United States. His father, Samuel Humphreys, was for a long time Chief Constructor of the Navy, and at the date of Andrew's birth, November 2d, 1810, was stationed at Philadelphia. Young Humphreys' early association with the service of the United States naturally led him to desire to enter it. He was appointed a cadet in the Military Academy at West Point when seventeen years old, and was graduated four years later, July 1st, 1831, with the rank of Second Lieutenant.

For eight months following his graduation he was on special duty at the Academy as Assistant Professor of Engineering, and was then assigned to his regiment, Second Artillery, engaged in the war against the Cherokee Indians in Florida. The following two years found Lieutenant Humphreys in Georgia in the discharge of duties as Topographical Engineer in Government surveys of the State. In 1836, during the Seminole war, he was recalled to his regiment, and did gallant service in many of the engagements with the Indians. Such was the bravery he exhibited that he was promoted to the rank of First Lieutenant. He retained the rank for a short time only, resigning his commission September 30th, 1836. From this time until February 13th, 1839, when he was reappointed First Lieutenant, Corps of Topographical Engineers, to rank from July 7th, 1838, he was chiefly engaged in making plans for the Brandywine Shoal Lighthouse in Delaware Bay and other Government works then in progress.

As a topographical engineer, Lieutenant Humphreys took high rank, and many of the most important engineering works of the Government were conducted by him. The improvement of the harbor of Chicago, the survey of the delta of the Mississippi River, and the explorations and surveys for railroads from the Mississippi River to the Pacific Ocean were all at different times under his charge. He was also for some time in charge of the Coast Survey, and received his commission as Captain while assigned to this duty.

Soon after the beginning of the War of the Rebellion he was promoted to the rank of Major of the Corps of Topographical Engineers, and was made Chief Engineer of the Army of the Potomac. For gallantry in the battle of Gettysburg he was made Major-General of Volunteers and Brigadier-General United States Army. In November, 1864, General Humphreys was given command of the Second Army Corps, and remained in that position until the close of the war.

In 1866 he was placed in command of the Corps of Engineers and in charge of the Engineering Bureau in Washington, which position he

held until June 30th, 1879, when, at his own request, after forty years of service, he was retired. Whilst in command of the Engineer Corps many important commissions were intrusted to him, among which were the examination of canal routes across the Isthmus of Panama, the surveys of the Hudson River and of Baltimore harbor, and the construction of the Washington Monument.

General Humphreys was a gentleman of culture and refinement, and the author of several books on engineering and military subjects. He was an active member of a number of scientific societies in the United States, and an honorary member of the Imperial Royal Geological Institute of Vienna. He was elected an Honorary Member of the American Society of Civil Engineers May 7th, 1873.

SAMUEL KEEFER, M. Am. Soc. C. E.*

DIED JANUARY 9TH, 1890.

Among the many emigrants coming to the United States, during the last century, was George Kiefer, a native of Alsace. He settled in the then British Province of New Jersey, near Newton in Sussex County. During the Revolutionary war he served as a private in the British army and died of army fever at Staten Island.

His son George was born in 1773, and remained on his father's farm until he was eighteen, when, his property having been confiscated by the United States, he accepted a home in Canada tendered him, as the son of a United Empire Loyalist, by the British Government.

He selected his home in Canada, about seven miles from the Falls of Niagara. Here he brought his mother and brother in 1792, and remained until his death. In 1797 he married, and of the five sons and four daughters born to him, Samuel Keefer, the eminent Canadian engineer, was the fourth son. His father spoke German until his arrival in Canada, then changed the spelling of his name to Keefer, that it might correspond with the English pronunciation.

Samuel Keefer was born in Thorold, County of Welland, January 22d, 1811. His father, George Keefer, was a Captain in the Canadian Militia, in the War of 1812, and was the first President of the Welland Canal Company. This canal passed through his property, and many of

* Committee to prepare Memoir, Mr. Thomas C. Keefer, Past President Am. Soc. C. E.

the engineers engaged in that work were, at different times, guests in his house. To this fact may be attributed Samuel's choice of a profession. His early education was gained at the country schools within his reach, but after the Upper Canada College in Toronto was founded, he became a pupil there and remained two years, until 1833.

Soon after leaving college he was appointed Secretary to the Board of Canal Commissioners for the improvement of the River St. Lawrence.

On the commencement of the construction of the Cornwall Canal, in 1834, he was appointed assistant to the Chief Engineer, John B. Mills, and remained in that position until 1839. In that year he was appointed Secretary to the Board of Works for Lower Canada.

When Upper and Lower Canada were united and a Board of Works for the united province was appointed, Mr. Keefer was made engineer of the Board, August 7th, 1841. For thirteen years he remained in this position, which was one of great labor and responsibility. Besides the construction and enlargement of the Welland Canal, other canals upon the St. Lawrence and Richelieu Rivers were placed in his charge which required constant oversight. From 1846 to 1848 he also acted as chief engineer of the Welland Canal. In 1852 he made the first surveys for a canal on the Canadian side of the Sault Ste. Marie, which work is only now under construction.

Mr. Keefer's work under the Department was very varied, comprising canals, roads, bridges, harbors and lighthouses. He personally surveyed and established the line of the Beauharnais Canal, and the first enlargement of the Lachine Canal. He also directed the construction of the locks and dams on the Ottawa and Richelieu Rivers. In 1850, in the St. Lawrence Canals, he substituted solid pine timber gates for the more costly oak frame ones then in use. The timbers of pine, like thick plank laid on top of each other, were reduced at the ends to the width of the heel and the post but wider elsewhere, being arched against the pressure side, giving greater strength as well as greater durability.

During this period, 1843–44, he also constructed the first suspension bridge in Canada, over the Ottawa River, connecting the cities of Ottawa and Hull. He here had an opportunity of bringing his engineering qualities into exercise and of putting his mathematical knowledge, for which he was distinguished at college, to practical use.

In the construction of the bridge he adopted the Freiburg wire system, instead of the Menai chain system, and made his plans with very limited assistance from engineering literature, there being very little accessible to him. That he thoroughly mastered the problem presented to him is evident from the fact that the Ottawa bridge served its purpose and remained for forty-five years in use, being replaced by another only when the exigencies of increased traffic rendered it necessary. It is somewhat singular that while Mr. Keefer was so successful in this work other engineers of prominence were not so fortunate. Two suspension

bridges in Canada were afterwards blown down or fell, and two in the United States met a like fate.

In 1845 he was again called upon to plan an original work, of which there was no type in existence. Timber slides for the passage of cribs with men to guide them, had been in use for some years, but to regulate the necessary depth of water, which must not exceed 12 to 15 inches, stop logs of varying dimensions were put in or taken out as the river at the head of the slide rose or fell. Mr. Keefer had read an account of the Bear Trap sluice in use at an early date, but long before abandoned, on the rivers of Pennsylvania, and adopted the principle to afford an automatic regulator, by which the gate of the Bear Trap being set for a given feed of water would rise or fall with the fluctuation of the stream, always feeding the same quantity. This was applied to the Government slides at Ottawa, and it worked successfully for years.

In 1853 Mr. Keefer was offered a more lucrative position on the Grand Trunk Railway than the one he held under the Government. He resigned the latter, and on assuming his new duties was given charge of the location of the line between Montreal and Kingston, which he had previously surveyed for the Government while in its service. He also conducted the survey of the Victoria Bridge and established the line upon which it was constructed. From 1853 to 1857 he also held the position of Supervising Engineer of the Brockville and Ottawa Railway, connecting the Brockville and Ottawa Rivers.

In 1857 he was recalled by the Government and became Inspector of Railways and Deputy Commissioner of Public Works. In the latter capacity he was charged, in the absence of the Chief Commissioner, with the selection, from a competitive test, of the design for the public buildings of Ottawa. His report was approved, and the work was commenced under his direction. By his advice the location and arrangement of the buildings were changed to some extent, materially improving the general effect.

He resumed the private practice of his profession in 1864, making his home at Brockville. Among other engineering works he undertook the construction of a wire suspension bridge over the Niagara River of a span of 1 268 feet, then the longest in existence. For the plans of this bridge he was awarded a gold medal at the Paris Exhibition in 1878. It was built in 1869, and continued in use for twenty years without failure of any kind. In 1889, without consulting Mr. Keefer, the owners replaced the single track roadway by a double-track one, and three months after this new roadway was torn from its cables and guys by a terrific wind.

In 1870 he re-entered the Government service as Secretary to the Canal Commission, whose special object was to determine the scale of navigation for the enlargement of the Canadian canals. In 1872 he made a survey

for a proposed canal, the Baie Verte, to connect the Gulf of St. Lawrence and the Bay of Fundy, and submitted plans and estimates. The project was abandoned however in favor of a ship railway over the same route.

In 1875 he constructed for the City of Ottawa the Dufferin Bridge over the Rideau Canal, and enlarged another which had been built by the Royal Engineers about fifty years before.

In 1880, he served as one of the Royal Commissioners appointed to investigate the affairs of the Canadian Pacific Railway from its inception. This road was a public work, and had originated and been built and conducted under a reform administration. When a conservative Government came into power an investigation into the work of their predecessors followed. Mr. Keefer was an open conservative, hence his name does not appear in Government connection between 1873 and 1880. After his retirement from Government service Mr. Keefer devoted himself to the private practice of his profession, which became very extensive and lucrative. His services as an experienced hydraulic, bridge and railway engineer were constantly demanded, and many of the most important private engineering works in Canada were intrusted to him. He continued actively in his professional duties until about two years prior to his death, when he contracted the disease with which he died.

Deducting his college years, between his experience on the Welland Canal as a lad, to his cessation from labor, he must be credited with nearly sixty years of practice—a long, useful and honorable career which in no small degree contributed to the position which Canada now holds as the possessor of public works unsurpassed by any country of similar wealth and population.

Mr. Keefer was elected a Member of the American Society of Civil Engineers, January 6th, 1869, and of the Institution of Civil Engineers, March 1st, 1870. In 1889 he was made president of the Canadian Society of Civil Engineers.

In his private character Mr. Keefer was a man beyond reproach. A consistent member of the Church of England, he carried his principles into private life and adorned it with the truths that he not only believed but practiced.

He was chosen several times to represent the church of which he was a member in Diocesan and Provincial Synods and served upon the Mission Board.

In disposition he was very light and cheerful, and entirely free from anything approaching irritability.

Mr. Keefer died at his residence in Brockville, from malarial fever, on the 9th of January, 1890, within a fortnight of entering upon his eightieth year.

JOSHUA LATHROP GILLESPIE, M. Am. Soc. C. E.*

DIED AUGUST 22D, 1890.

J. L. Gillespie, son of the Right Reverend George D. Gillespie, D.D., and Rebecca Lathrop Gillespie, was born at Cincinnati, Ohio, December 9th, 1848, and died at Hartford, Connecticut, August 22d, 1890, in his 42d year. He was buried at Ann Arbor, Michigan.

His earlier education was in the public schools of Ann Arbor, and, in September, 1867, he entered the University of Michigan. He graduated as Ph.B. in 1871 and as C.E. in 1872. During his college life he was at times employed with U. S. Lake Survey parties in Western New York and in Michigan.

On May 17th, 1873, he entered the service of the United States as Assistant Engineer, was placed, by the late Colonel F. U. Farquhar, Corps of Engineers, in charge of the very important work, "The Preservation of the Falls of Saint Anthony," and remained in charge until its completion in 1878. This work consisted mainly in the construction of a concrete dike, extending from bank to bank of the Mississippi River, connecting the limestone ledge forming the bed of the river with a hard stratum of sand-rock, 38 feet below, and cutting off all flow of water through, and thereby preventing the destruction of the soft sandstone lying under the limestone ledge. The work was a hazardous one, requiring ready resources, and its progress was closely watched by the citizens of Minneapolis, whose interests were deeply involved in its execution. At first the employment of so young an engineer as Mr. Gillespie on so important an undertaking was protested against, but later, the citizens proclaimed their warm approval of his management, and, upon its completion, presented him with a valuable testimonial of their appreciation. The many exigencies of this peculiar and treacherous work gave ample opportunity for the cool and determined engineer to establish a record for competence such as few so young enjoy. His success in constantly meeting new difficulties with just the remedy needed stamped him as an engineer of great natural ability. The reputation and experience thus gained by Mr. Gillespie led to his employment by the large water-power interests of Minneapolis on numerous occasions as consulting engineer in connection with important matters.

After the completion of the work for "The Preservation of the Falls" Mr. Gillespie was placed in local charge of the improvement of a section of the Upper Mississippi River, in the conduct of which was displayed the same ability, energy and sound common sense that characterized his earlier labors.

* Committee to prepare Memoir, Major A. Mackenzie, M. Am. Soc. C. E., and Mr. H. E. Stevens, M. Am. Soc. C. E.

In November, 1885, ill health, which interfered with such conscientious devotion to duty as Mr. Gillespie desired to give to all his work, led him to sever his connection with the Government and seek rest and health for a time in European travel and later at his adopted home in Saint Paul, Minn.

To all with whom Mr. Gillespie was brought in contact he endeared himself by his many noble qualities; and, while a career which gave promise of a brilliant future has been cut short by sickness and death, the man will always live in the memory of his legions of friends.

Mr. Gillespie was elected a Junior of the Society February 3d, 1875, and a Member April 2d, 1884.

LIST OF MEMBERS.

ADDITIONS.

MEMBERS.

		Date of Election.
AERTSEN, GUILLIAEM	Latrobe, Pa	Oct. 1, 1890
BAILEY, GEORGE IRVING	Engineer in charge, Mohawk, N. Y	Oct. 1, 1890
COVODE, JAMES HENRY	English Club, Montevideo, Uruguay, South America	April 2, 1890
FAVA, FRANCIS RENATUS, Jr.	Corcoran B'ld'g, Washington, D. C	Nov. 5, 1890
KASTL, ALEXANDER EDWARD	First Assistant Engineer, Harbor Works, Tampico, Mexico	J. Jan. 4, 1888 M. Nov. 5, 1890
SAABYE, OSCAR ANTON FREDERICK	Division Engineer, Norfolk and Western R. R., Roanoke, Va.	Oct. 1, 1890
SCAIFE, WILLIAM LUCIEN	Scaife Foundry and Machine Co., Pittsburgh, Pa	Dec. 3, 1890
SENGOKU, MITSUGU	Railway Department, Tokio, Japan	June 4, 1890
TOBIAS, JOB MEADE	Cartagena, Colombia, South America	Sept. 3, 1890

ASSOCIATE.

JACOBY, HENRY SYLVESTRE	Assistant Professor Civil Engineering, Cornell University, 3 Quarry st., Ithaca, N. Y	Nov. 5, 1890

JUNIORS.

BETTES, CHARLES ROBERT	(Care Charles B. Brush), 1 Newark st., Hoboken, N. J.	Oct. 1, 1890
CHADBOURN, WILLIAM HOBBS, Jr.	Chief Engineer, Wilmington, Chadbourn & Conway R. R., Chadbourn, N. C	Dec. 3, 1890
DAVIS, CHANDLER	Pier A, North River, New York City	Dec. 3, 1890
DAVIS, HENRY LEWIS	18 City Hall, New Haven, Conn.	Nov. 5, 1890
FURMAN, JOB ROCKFIELD	(Care Otis Bros. & Co.), 36 Park Row, New York City	July 2, 1890
HEALY, JOHN FRANCIS	Birmingham, Ala	Jan. 2, 1890

PAINE, GEORGE HEBARD.....Union Switch and Signal Co., Swissvale, Pa..... Nov. 5, 1890
SHREVE, ARTHUR LEE.....P. O. Box 883, Baltimore, Md.. Nov. 5, 1890
STITES, ARTHUR COCHRAN.....Keith & Berry B'ld'g, Kansas City, Mo..... Dec. 3, 1890
TREADWELL, LEE.....Engineer in charge Pacific Short Line Bridge Co., Sioux City, Iowa..... Nov. 5, 1890
TRIEST, WOLFGANG GUSTAV FELIX.71 Broadway, New York City... Sept. 3, 1890

CHANGES AND CORRECTIONS.

MEMBERS.

ALLEN, JAMES P.....126 Wentworth st., Charleston, S. C.
ALLEN, KENNETH.....(Care H. C. Frick Coke Co.), Scottdale, Pa.
ARCHER, WILLIAM.....Assistant Engineer, Baltimore and Ohio Southwestern R. R., Cincinnati, Ohio.
BAKER, HOLLAND W.....441 D st., Tacoma, Washington.
BATES, ONWARD.....Engineer and Superintendent Bridges and Buildings, C., M. and St. P. Ry., Rand & McNally B'ld'g, Chicago, Ill.
BEAHAN, WILLARD.....Watkins, N. Y.
BERRIAN, RICHARD M.....Morton House, Niantic, Conn.
BILLIN, CHARLES E.....Superintendent Bridge and Construction Department, Pennsylvania Steel Co., Steelton, Pa.
BLACKWELL, CHARLES.....5224 Baum st., Pittsburgh, Pa.
BODFISH, SUMNER H.....58 B st., N. E., Washington, D. C.
BRACKETT, DEXTER.....710 Albany st., Boston, Mass.
BUSH, HARRY D.....(Care George S. Morison), 35 Wall st., New York City.
BUTLER, MATTHEW J.....Chief Engineer, K., N. and W. Ry., Napanee, Ont., Canada.
COFFIN, WILLIAM B.....Superintendent Jacksonville, Tampa and Key West Ry., Jacksonville, Fla.
CRAIG, CHAMBERS M.....Chief Engineer, M. T. & M. R. R., Ala. Midland R. R., Montgomery, Ala.
DE COURCY, BOLTON W.....U. S. Engineer's office, Second and Washington sts., Portland, Oregon.
DENNIS, WILLIAM F.....308 E. Clay st., Richmond, Va.
DICKINSON, GEORGE C.....Cobham, Albemarle Co., Va.
DORSEY, EDWARD BATES.....Junior Traveler's Club, 8 St. James' Square, London, S. W., England. (Care Union League Club, New York City.)
DUNCKLEE, JOHN B.....Assistant Engineer Potomac River Improvement, 601 18th st., N. W., Washington, D. C.

EGGLESTON, T. C.....P. O. Box 186, Richmond, Va.
FARLEY, GEORGE M.....(Care Pennsylvania Co.), New Brighton, Pa.
FERGUSON, JOHN W.....(Care Cofrode & Saylor), 198 Eleventh ave., New York City.
GOULD, E. SHERMAN.....(Care Runkle, Smith & Co.), Monte No. 1, Havana, Cuba.
GREENE, EDWARD A.....Mass. and Southern Construction Co., 7 Nassau st., New York City.
GRISWOLD, FRANK L.....Cosmos Club, Buenos Ayres, Argentine Republic.
HAINS, PETER C.....Lt. Col., Corps of Engineers, U. S. A., 601 Eighteenth st., N. W., Washington, D. C.
HATCH, FRED. T.....Engineer Maintenance of Way, P., C. & St. L. Ry., 2 Carson st., South Side, Pittsburgh, Pa.
KILLEBREW, SAMUEL.....Chief Engineer Northern Div., M. P. Ry., San Juan Bautista, Tabasco, Mexico.
KING, PAUL S.....Chief Engineer Lehigh Valley Ry., cor. Seneca and Main sts., Buffalo, N. Y.
KIRTLAND, ALFRED P.....Cheswick, Acmetonia P. O., Alleghany Co., Pa.
KITTREDGE, GEORGE W.....Engineer Maintenance of Way, C., C., C. & St. L. Ry., Indianapolis, Ind.
LATCHA, JACOB A.....Coldwater, Mich.
LE BARON, J. FRANCIS.....Mandarin, Fla.
LOW, EMILE.....Division Engineer Clinch Valley Div. N. & W. R. R., Estonoa, Wise Co., Va.
MASON, ARTHUR J.....Austin, Texas.
MAXSON, FRANK O.....Civil Engineer U. S. N., Navy Yard, Mare Island, Cal.
MCKEE, SAMUEL B.....Mineville, N. Y.
MEIER, EDWARD D.....Pres. and Chief Engineer Heine Safety Boiler Co., 707 Bank of Commerce B'ld'g, St. Louis, Mo.
MINTURN, ROWLAND R.....Superintendent Wisconsin Valley Div., C., M. & St. P. Ry., Tomah, Wis.
MITCHELL, HENRY.....18 Hawthorne st., Roxbury, Mass.
MOORE, CHARLES E.....Principal Assistant Engineer Fort St. Union Depot Co., Detroit, Mich.
NOYES, ELLIS B.....Assistant Engineer in charge N. Y. State Canals, Stillwater, N. Y.
OPDYKE, STACY B., Jr.....226 South Fourth st., Philadelphia, Pa.
PAINE, CHARLES.....71 Broadway, New York City.
PALMER, CORNELIUS.....Division Engineer Peninsula Div., C. & N. W. Ry., Escanaba, Mich.
PARKER, C. O.....221 Moon st., Chattanooga, Tenn.
PEW, ARTHUR.....Chief Engineer W. & T. R. R., Dublin, Ga.
PLAYLE, EDWARD F.....4 South Clark st., Room 6, Chicago, Ill.
POST, LEVI W.....529 Summit ave., Jersey City, N. J.

PRINDLE, FRANKLIN C.....Civil Engineer U. S. N., Navy Yard, Boston, Mass.
RICE, L. FRED.....95 Milk st., Boston, Mass.
ROCKWELL, SAMUEL.....17 Baker st., San Francisco, Cal.
RUSSELL, NATHANIEL E.....580 First ave., Lansingburgh, N. Y.
SCHENCK, ARCHIBALD A.....Chief Assistant Engineer, N. Y. C. & H. R. R. R., and West Shore R. R., Grand Central Station, New York City.
SEDGWICK, THOMAS S.....Chief Engineer Board of Harbor Commissioners, San Diego, Cal.
SEARLES, WILLIAM H.....1139 Summit ave., Jersey City, N. J.
SHEARER, SAMUEL H.....Manager Western Paving and Supply Co., Room 7, Ingalls Block, Indianapolis, Ind.
SMITH, D. LOWBER.....62 West 83d st., New York City.
SMITH, JOSEPH S.....Manheim st., cor. Morris st., Germantown, Philadelphia, Pa.
STANTON, ROBERT B.....P. O. Box 1405, Denver, Colo.
STEWART, JOHN M.....(Care H. W. Adams & Co.), 56 Pine st., New York City.
TALCOTT, E. N. KIRK.....Florida, Orange Co., N. Y.
THOMPSON, GAYLORD.....Engineer Department, Aqueduct Commission, Reservoir D, Carmel, N. Y.
TOMLINSON, ALFRED T.....1250 Grant ave., Denver, Colo.
VANCE, HART.....516 W. Jefferson st., Louisville, Ky.
WAGNER, SAMUEL TOBIAS.....The Phœnix Bridge Co., Phœnixville, Pa.
WALLACE, J. H.....Assistant Engineer Maintenance of Way, S. P. Co., San Francisco, Cal.
WASHBURN, FRANK S.....4559 Woodland ave., Kenwood, Chicago, Ill.
WELLMAN, DAVID W.....Assistant Engineer Missouri River Commission, 1515 Lucas pl., St. Louis, Mo.
WHEELER, LEVI L.....Milan, Ill.

ASSOCIATE.

TRAUTWINE, JOHN C., Jr.....Stamford, Conn.

JUNIORS.

BARNEY, SAMUEL E.....346 Whitney ave., New Haven, Conn.
BEHRENS, WILLIAM F.....P. O. Box 568, Albuquerque, N. M.
BONNETT, CHARLES P.....(Care West India Improvement Co.), 25 Pine st., New York City.
BUTTS, ELIJAH P.....Resident Engineer Burlington Bridge, Burlington, Iowa.
CARLL, DAVID S.....Assistant Engineer Georgetown Ry., Georgetown, D. C.
CUSHING, WILLIAM C.....Engineer Maintenance of Way, C., St. L. and P. R. R., Indianapolis, Ind.
EDES, WILLIAM C.....Room 79, Railroad Bld'g., San Francisco, Cal.

FOWLER, C. E.....288 North High st., Chillicothe, Ohio.
FUERTES, JAMES H.....City Engineer's Office, Wichita, Kans.
GRAY, WILLIAM.....Aqueduct Commission, Carmel, N. Y.
HOWE, HORACE J.....New York, Lake Erie and Western R. R., Elmira, N. Y.
INGALLS, OWEN L.....1133 13th st., N. W., Washington, D. C.
KELLOGG, NORMAN B.....Resident Engineer, S. P. Co., Oakland, Cal.
MATLACK, CHARLES P.....Resident Engineer, I. and G. N. R. R., Palestine, Texas.
MODJESKI, RALPH.....(Care Union Bridge Co.), Athens, Pa.
MOSES, JOHN C.....(Care Detroit Bridge and Iron Works), Detroit, Mich.
NAYLOR, EZRA B.....25 West 133d st., New York City.
ROEHM, GEORGE E.....(Care Milwaukee Bridge and Iron Works), Milwaukee, Wis.
SHERWOOD, GEORGE W.....101 East 25th street, New York City.
SISSON, WILLIAM LEE.....Assistant Engineer, B. and O. R. R., 219 South Townsend st., Baltimore, Md.
STEWART, WILLIAM J.....First Assistant City Surveyor, Rochester, N. Y.
TALLON, JOHN J.....(Care Charles B. Brush), 1 Newark st., Hoboken, N. J.
TEMPLE, J. FRED.....(Care American Bridge and Iron Works), Roanoke, Va.
THOMPSON, CLARK W.....Orchard pl., La Crosse, Wis.
THOMSON, T. KENNARD.....Bridge Engineer, Ohio Extension N. and W. R. R., Kenova, W. Va.
VILLALON, JOSE R.....The Spanish American Iron Co., Santiago, Cuba.
WHEATLEY, ARTHUR C.....Mexican Pacific Ry., San Juan Bautista, Tabasco, Mexico.
YATES, PRESTON K.....236 West 55th st., New York City.
YEATMAN, HENRY C.....Mexican Pacific Ry., San Juan Bautista, Tabasco, Mexico.

RESIGNATIONS.

MEMBER.

Date of Resignation.

MAGUIRE, EDWARD.....December 31, 1890.

JUNIOR.

TACHARD, ANDRE P.....December 31, 1890.

DEATHS.

KNIGHT, WILLIAM B.....Elected Junior, January 6, 1875; Member, January 7, 1880; died, December 7, 1890.
WHITMAN, THOMAS J.....Elected Member, January 29, 1868; died, November 26, 1890.

ADDITIONS TO

LIBRARY AND MUSEUM.

Academy of Science, St. Louis, Mo.:
Constitution and By Laws.
American Institute of Mining Engineers, New York:
Aluminium and Other Metals Compared.
Notes on the Energy and Utilization of Fuel, Solid, Liquid and Gaseous.
Crystalline Magnetite in the Port Henry, N. Y., Mines.
Aluminium in Wrought Iron and Steel Castings.
Preliminary Notes on the Thermal Properties of Slags.
The Rights of the Owner or Possessor of a Lode Mining Claim.
A System of Rail Sections in Series.
Transactions, Vol. XVIII, May, 1889, to February, 1890.
Argentine Scientific Society, Buenos Ayres:
General Index of Annals, 1876–1889.
Address of President Morales, July 15, 1890.
Carrol Ph. Bassett, Newark, N. J.:
Sewerage and Drainage of Williamsport, Pa.
Sewerage and Drainage of Orange, N. J.
Beyer & McCann, Hoboken, N. J.:
Reports of T. H. McCann and A. Fteley on a Central Sewerage Plan for the City of Hoboken, N. J.
Hon. John Bogart, State Engineer, Albany, N. Y.:
In Memoriam, Gen. Philip H. Sheridan.
A. P. Boller, New York:
Report upon the Construction of the Thames River Bridge.
Boston Public Library, Boston, Mass.:
Bulletins.
A. Bryson, Jr., New York:
Plans of the Rapid Transit Cable Co. for System and Terminals, N. Y. & Brooklyn Bridge.
Carnegie Brothers & Co., Pittsburgh, Pa.:
The Edgar Thomson Steel Works and Blast Furnaces.
California Academy of Sciences, San Francisco, Cal.:
A Revision of the South American Nematognathy.
Land Birds of the Pacific District.
Chas. E. Christensen:
Graphical Diagram for Approximate Calculation.
Chief of Engineers, U. S. A., Washington, D. C.:
Information relative to the construction of a bridge over the Eastern Branch of the Potomac River, Washington, D. C.
Report as to the advisability of utilizing the Fishing Battery Light Station.
Report upon the practicability and probable cost of an avenue from Washington Monument to Soldiers' Home, Washington, D. C.
Reports concerning the bridge over the Eastern Branch of the Potomac.
Report in reference to the improvement of Galveston Harbor.
Reports in regard to the Sault Ste. Marie Canal.
Proposals and Specifications:
For furnishing stone at Bar Harbor, Me.
The removal of the wreck A. J. Russell.
Constructing pile wharf at Sandy Hook N. J.
Constructing lock in the Wabash River.
Dredging harbor at Baltimore, Md.
Materials for jetties at Fort Monroe, Va.
Building railway track at Sandy Hook.
Removing wreck in Chester River, Md.
Improving Hudson River, N. Y.
Removal of Smith's Island, Philadelphia.
Construction of a sea wall, N. Y. Harbor
Construction of jetties in St. John's River.
Construction of bridge piers in Oakland Harbor.
Dredging Saint Clair Flat Ship Canal.
Furnishing valves for the lock at St. Mary's Falls Canal, Mich.
Improving Rouge River, Mich.
Removing wreck, M. E. Tremble.
Construction of lock at Nashville, Tenn.
Pile work in Savannah Harbor.
Removal wreck, Weybosset.
Dredging in Savannah River.
Building dam, Great Kanawha River.
Improving entrance to Key West Harbor.
Improving entrance to Galveston Harbor.
Improving harbor at Sheboygan, Wis.
Improving Racine, Wis.
Improving Kenosha, Wis.
Improving Santee River.
Improving Wapping Cut, S. C.
Improving Milwaukee Harbor.
Improving Charleston Harbor.
Improving Manitowa, Wis., Harbor.
Improving Menomonee River, Mich.
Improving Pascagoula River.
Improving Green Bay, Wis.
Improving Kewaunee, Wis.
Improving Charleston, S. C.
Improving Potomac River.
Improving Wappinger Creek.
Improving Beaufort River.
Building breakwater at New Haven.
Building pile dyke at Saugerties.
Dredging in Calumet Harbor.
Building breakwater at Rouse's Point.
Removing obstruction in East River, N. Y.
Report of the Preliminary Examination of the American Channel, Detroit River.
Report of the Preliminary Examination of Russell's Fork, Big Sandy River, Ky.
Report of the Preliminary Examination of Piscataway Creek, Md.
Report of the Preliminary Examination of Allouez Bay and the Nemadji River.
Report of the Examination and Survey of the Western Branch of Elizabeth River, Va.
Report of the Preliminary Examination of the San Rafael River, Cal.
Report of the Examination of the Lower Columbia River, Oregon.
Report of the Preliminary Examination for a thoroughfare from Cape May to the Great Bay north of Atlantic City, N. J.

Report of the Preliminary Examination of Buttermilk and Gowanus Bay Channels, New York Harbor.
Report of the Preliminary Examination of the Harbor of Blue Hill, Maine.
Report of the Preliminary Examination of the Shoals at the Mouth of North River, Mass.
Report of the Preliminary Examination of the D'Warnish and Black Rivers, Washington.
Report of the Preliminary Examination for a Waterway to connect Lynn Haven Bay with the Eastern Branch of the Elizabeth River, Va.
Report of the Preliminary Examination of the Nooksack, Skagit and Snohomish Rivers, Washington.
Report of the Preliminary Examination of Big Barren River, Kentucky, above Bowling Green.
Report of the Preliminary Examination of Bensauken Creek, N. J.
Report of the Preliminary Examination of Redwood Creek, Cal.
Report of the Preliminary Examination of the Sound between Barnegat and Great Egg Harbor Bays, N. J.
Report of the Preliminary Examination of Boquet River, from the Mouth of Lake Champlain to Willsborough, N. Y.
Report of the Preliminary Examination of Cape May City, N. J., for Breakwater.
Report of the Preliminary Examination of the Deep Skamokawa and Crooked Rivers, Washington.
Report of the Preliminary Examination of North River, Salem, Mass.
Report of the Preliminary Examination of Alviso Harbor and Creek, Cal.
Report of the Examination of Pepperell Cove, Me.
Report of the Examination of Young's Bay Channel, Columbia River.
Report of the Examination of Upper Machodock Creek, Va.
Report of the Examination of the Mississippi River, at Warsaw, Ill.
Report of the Examination of Wabash River, Ind.
Report of the Examination of Bay Ridge Channel, New York Harbor.
Report of the Examination of San Simeon Bay, Cal.
Report of the Examination of Champlin's Creek, N. Y.
Report of the Examination of Piscataway Creek, Va.
Report of the Examination of Willamette River, Oregon.
Report of the Preliminary Examination of Shark River, N. J.
Report of the Preliminary Examination of the Colorado River, Arizona.
Report of the Preliminary Examination of Puyallup River, Washington.
Report of the Preliminary Examination of Little Egg Harbor Bay and Inlet, N. J.
Report of the Preliminary Examination of Potomac Creek, Va.
Report of the Preliminary Examination of Inner Bay, near Mouth of Saranac River, at Plattsburgh, N. Y.

Specifications and Proposals:
For construction and repairs of Breakwaters at Plattsburgh, N. Y., Gordon's Landing, Lake Champlain, N. Y.; Rockland, Me.; Housatonic River, Glen Cove, N. Y.; Portchester Harbor and Larchmont Harbor.
For improving the harbors of Duluth, Michigan City, Manistee and Grand Haven.
For removing wreck of the Schr. Josiah Whitehouse.
For building Dam No. 8.
For improving Harlem River, Hudson River and Newtown Creek, N. J.
For delivering stone and cement at Sandy Hook, N. J.
For delivering stone and cement for Harbor of Refuge, Cape Ann, Mass.
For constructing levees in the 4th District, Mississippi River.
For dredging in Boston, Manchester, Hingham, Winthrop, Salem, Scituate, Lynn and Plymouth Harbors, and at Nantasket Beach and in Weymouth River.
For rubble stone for the extension of North Jetty at entrance of Newburyport Harbor.
For alterations of Barge No. 48.
For dredging in New River, N. C., Beaufort River, S. C., Cape Fear River and Lockwood's Folly River.
For dredging in Georgetown and Beaufort Harbors.
For removing old bridge piers in Kennebec River, Me.
For Improving the Harbor of Grand Marais Mich., Harbor of Refuge, of Grand Marais, Oakland, Cal., and Marquette, Mich.
For removal of the wreck of the Schr. S. S. Bickmore.
For removal of wrecks in Savannah River, Ga.
For constructing an extension to dam at Alton, Ill.
For furnishing jute for works in the Mississippi River.
For building thirteen model barges.
For removal of wreck of Schr. Mary A. Rhoades.
For dredging in Cocheco River, New Hampshire.
For dredging in James River, Va.
For dredging in Narrangus River, Me., etc.
For dredging in Quincy Bay, Ill.
For dredging in Ticonderoga River, N. Y.
For dredging in Great Chazy River, N. Y.
For dredging at Edgartown, Wareham, etc., Harbors.
For dredging in Bellamy River, N. H.
For improving Appomattox River, Va.
For improving Harbor at Norfolk, Va.
For improving Harbor at Ontonagon, Mich.
For constructing Gibson's Landing Levee, Miss.
For construction of Breakwater at Little Harbor, N. H.
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